The European Journal of Education and Applied Psychology

2025, No 4

PREMIER Publishing

Vienna
2025

The European Journal of Education and Applied Psychology

Scientific journal

2025, No 4

ISSN 2310-5704

Proofreading Kristin Theissen
Cover design Andreas Vogel
Additional design Stephan Friedman
Editorial office Premier Publishing s.r.o.
Praha 8 – Karlín, Lyčkovo nám. 508/7, PSČ 18600
E-mail: pub@ppublishing.org
Homepage: ppublishing.org

European Journal of Education and Applied Psychology is an international, English/Russian language, peer-reviewed journal. The journal is published in electronic form.

The decisive criterion for accepting a manuscript for publication is scientific quality. All research articles published in this journal have undergone a rigorous peer review. Based on initial screening by the editors, each paper is anonymized and reviewed by at least two anonymous referees. Recommending the articles for publishing, the reviewers confirm that in their opinion the submitted article contains important or new scientific results.

Premier Publishing s.r.o. is not responsible for the stylistic content of the article. The responsibility for the stylistic content lies on an author of an article.

Instructions for authors

Full instructions for manuscript preparation and submission can be found through the Premier Publishing s.r.o. home page at: http://ppublishing.org

Material disclaimer

The opinions expressed in the conference proceedings do not necessarily reflect those of the Premier Publishing s.r.o., the editor, the editorial board, or the organization to which the authors are affiliated.

Premier Publishing s.r.o. is not responsible for the stylistic content of the article. The responsibility for the stylistic content lies on an author of an article.

Included to the open access repositories:

НАУЧНАЯ ЭЛЕКТРОННАЯ БИБЛИОТЕКА eLIBRARY.RU

Scientific Journal Impact Factor
TOGETHER WE REACH THE GOAL

SJIF 2023 = 6.665 (Scientific Journal Impact Factor Value for 2023).

Typeset in Berling by Ziegler Buchdruckerei, Linz, Austria.
Printed by Premier Publishing s.r.o., Vienna, Austria on acid-free paper.

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

Section 1. General pedagogy

DOI:10.29013/EJEAP-25-4-3-7

IMPACT OF AI ON THE EDUCATION SYSTEM

Alishov Monssum Adil oglu [1]

[1] Baku State University (Baku, Azerbaijan)

Cite: *Alishov M.A. (2025). Impact of Ai on The Education System. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-3-7

Abstract

Artificial intelligence (AI) is rapidly transforming the education system through adaptive learning platforms, AI-driven tutoring systems, and automated grading tools. While these innovations offer personalized learning experiences and improve efficiency, they also raise challenges related to equity, privacy, and the evolving role of teachers. This article is intended for informational purposes and does not involve practical experiments. It examines AI's impact on instructional practices, learner outcomes, teacher workload, and ethical considerations, emphasizing the need for clear policies, professional development, and equitable implementation to maximize AI's potential in education.

Keywords: artificial intelligence in education, adaptive learning, personalized tutoring, educational equity, teacher workload, data privacy, educational policy

Introduction

Introduction: The integration of artificial intelligence (AI) into the education system represents a significant shift in how teaching and learning are conducted. With advancements in adaptive learning technologies, intelligent tutoring systems, and automated assessment tools, AI promises to personalize education, enhance student engagement, and alleviate teachers' administrative burdens. However, its adoption also brings forth critical questions regarding equity, data privacy, academic integrity, and the changing role of educators. This paper explores the multifaceted impact of AI on education, drawing on recent research and case studies to analyze both its potential benefits and challenges. By examining AI's influence on instructional practices, student outcomes, and teacher roles, this article aims to provide a comprehensive overview of the current landscape and future directions for AI in education.

Artificial intelligence applied to education (often called AIED) has become a significant field, with the global AIED market valued at USD1.82 billion in 2021 and projected to grow by about 36% annually (Vieriu, A. M. and Petrea, G., 2023). Recent surveys show that 43% of U.S. college students are using AI-based tools (such as ChatGPT), and roughly half of instructors have started incorporating AI into lesson design (Varsik, S. and Vosberg,

L., 2024). These figures demonstrate that AI adoption is spreading rapidly across both K-12 and higher education. For example, modern learning management systems (such as Absorb LMS and Docebo) now include features for intelligent content creation, feedback, and learning analytics, enabling more personalized instruction (Ash, A. M., 2025). Early evidence suggests significant advantages: adaptive learning systems have been shown to improve test scores by around 62%, and overall AI use has been associated with roughly 30% gains in student performance and a 20% reduction in student anxiety (Wang, S., Wang, F. and Zhu, Z., et al., 2024). Together, these findings suggest that AI has considerable promise for enhancing student engagement and learning outcomes.

However, introducing AI into classrooms also raises important questions. It challenges conventional teaching methods – for instance, balancing human-led instruction with AI support – and draws attention to issues of digital equity and ethics (National Education Association. 2025; Vilcarino, J. and Langreo, L., 2025). Concerns include students becoming overly dependent on technology, potential biases in AI systems, and privacy risks. For example, if access to AI resources is uneven across schools, existing achievement gaps could widen (Vilcarino, J. and Langreo, L., 2025). Similarly, fully automated feedback might decrease opportunities for direct teacher-student interaction: some students report feeling less connected to their teachers when AI is heavily used. In light of these challenges, fully realizing the benefits of AI in education will require careful planning and support. Ensuring teachers receive proper training on these technologies, implementing strong data protections, and creating policies that safeguard equity and civil rights will be essential.

AI technologies are revolutionizing teaching methods by supporting more personalized, data-driven instruction. Adaptive learning platforms and intelligent tutoring systems, for example, use algorithms that modify content dynamically based on each student's performance. Khan Academy's AI-based tutor, Khanmigo (built on GPT-4), is one such system that provides targeted hints and feedback in subjects like math and language arts. Similarly, language-learning apps such as Duolingo use AI to adjust exercises to each learner's progress. Research indicates that these AI-driven tools can significantly enhance learning by offering immediate feedback and custom learning pathways, which often result in greater student engagement and improved performance (Wang, S., Wang, F. and Zhu, Z., et al., 2024).

AI-driven platforms continuously gather information about students' errors and learning pace, adjusting the difficulty and content of instruction accordingly. This ongoing customization allows learners to study at the appropriate challenge level for them. In practice, these adaptive algorithms have been observed to raise test scores by more than 60% in some settings (Wang, S., Wang, F. and Zhu, Z., et al., 2024), and learners in courses supported by AI tools often report higher confidence and motivation in their abilities.

Beyond traditional educational software, AI-powered chatbots and virtual tutors offer personalized, one-on-one assistance. For example, conversational agents can be available around the clock to answer student questions, simulating the interaction with a human tutor. These tools help reinforce learning outside of class time and provide students with immediate feedback on their assignments.

AI is also being applied to grade homework and exams. By using techniques from natural language processing and computer vision, AI systems can automatically score essays and problem sets. Automating grading can free teachers from routine tasks. One report notes that AI tools are increasingly used to handle administrative tasks like grading and giving feedback. This automation not only saves teachers time but can also deliver more consistent and rapid feedback to students.

Overall, these AI tools expand educators' pedagogical options. Teachers can use learning analytics dashboards to identify students who are struggling and then tailor instruction to address those needs. Machine learning algorithms can even predict which topics are likely to require reteaching. As one review observes, research in educational AI "covers a wide spectrum of applications, including adaptive learning and personalized tutoring, intelligent assessment, and emerg-

ing products". In effect, these approaches change teachers' roles into those of facilitators and learning designers, while AI systems take on more of the data analysis and routine instructional tasks.

AI's ability to personalize instruction can increase student motivation and mastery of material. Studies consistently show that learners report higher engagement levels when using AI-supported educational tools. For example, one recent study found that AI-enhanced learning "offers significant benefits, including personalized learning, improved academic outcomes, and enhanced student engagement". AI-based platforms give immediate, individualized feedback, helping students stay involved and progress steadily. In practice, some schools using adaptive learning software have seen substantial gains: the often-cited 62% improvement in test scores under adaptive learning (Wang, S., Wang, F. and Zhu, Z., et al., 2024) highlights AI's potential to accelerate learning.

However, educators have raised concerns about potential downsides. A 2025 survey of U.S. teachers and students found that many feel extensive use of AI in classrooms can weaken important skills. Notably, about 50% of students reported feeling less connected to their teachers when AI was heavily used, and a similar proportion of teachers observed reduced peer interaction. Furthermore, 70% of teachers worried that AI could undermine students' critical thinking and research abilities. These findings suggest that if AI replaces too much human interaction or encourages students to rely on quick answers, it could hinder deeper learning. Balanced integration is therefore needed so that AI supports rather than replaces discussion, collaboration, and problem-solving activities.

AI has the potential to both improve and worsen educational equity. On one hand, AI tools can aid diverse learners by adapting to different language levels or abilities, which could help narrow achievement gaps. On the other hand, unequal access to technology may exacerbate existing disparities. The OECD emphasizes that AI implementation must be handled carefully: if factors like internet connectivity, device availability, or algorithmic bias are not addressed, AI could reinforce current inequities (Vilcarino, J. and Langreo, L., 2025). For example, if only well-funded schools can afford the latest AI tutors, students in under-resourced areas may fall further behind. Achieving equitable outcomes may therefore require policies such as subsidizing technology access and designing AI systems that are culturally and contextually responsive.

AI also raises concerns about academic honesty and data privacy. Easy access to AI text generators or solution-makers creates new cheating risks; many educators worry that students might use AI to complete assignments without actually learning the material. Educational institutions will need to update academic integrity policies and teach students how to use AI tools responsibly. Student data privacy is another critical issue. Overall, AI's impact on students is dual-edged: it promises personalized support and better achievement, but it must be guided by safeguards to protect skill development and fairness (Vilcarino, J. and Langreo, L., 2025).

Research indicates that AI can significantly cut down on teachers' administrative workload. For example, a 2025 Gallup survey of U.S. K-12 teachers found that 60% to 84% of those who used AI for various tasks said it saved them time. Teachers who adopted AI on a regular basis (using it weekly) estimated an average savings of about 5.9 hours per week – roughly six weeks of work time per year. These time savings allow teachers to dedicate more effort to lesson planning, individualized instruction, and providing feedback to students. In fact, 57% of teachers using AI for grading reported an increase in work quality, and 74% noticed improvements in their administrative tasks. In summary, AI tools (such as automated graders, content generators, and attendance systems) are beginning to automate routine tasks and give educators back valuable time.

As AI automates routine tasks, the role of the teacher is evolving. Educators are increasingly becoming facilitators and learning coaches. They select and customize AI-generated content, interpret data from learning analytics dashboards, and concentrate on higher-order teaching activities such as fostering critical thinking and collaboration. However, this shift also requires new skills: teachers must learn how to use AI tools both

effectively and ethically. At present, many educators feel unprepared for this change. For instance, one report found that fewer than half of teachers (48%) had received any school-provided training specifically focused on AI. Without expanded professional development (PD), teachers may not fully tap AI's potential or might use it inappropriately. Experts therefore recommend increased PD – training teachers in AI literacy, data ethics, and best practices – so that educators can "do it right" and guide students in the proper use of AI.

Overall, most teachers who have adopted AI report finding it helpful. In the Gallup study, a majority said AI had improved the quality of their work. Teachers indicated using AI for tasks such as lesson preparation (37% used it monthly), generating worksheets (33%), and customizing materials for students' needs (28%). However, educators also face challenges: many schools lack clear AI policies, and teachers worry about the potential for job displacement. The available data suggest that teachers tend to be optimistic yet cautious – they view AI as a tool that saves time but recognize it cannot replace the empathy, creativity, and mentorship provided by human teachers. In practice, many educators argue that AI should serve as an assistant rather than an authority, ensuring that teachers remain the final decision-makers in instructional and assessment matters.

AI systems can inadvertently perpetuate biases if their training data or design are flawed. In education, this might mean an AI tutor that works better for certain groups of students or an automated assessment tool that misjudges students who use nonstandard language. International organizations such as the OECD warn that without proper oversight, AI may "exacerbate existing disparities" (Vilcarino, J. and Langreo, L., 2025). For example, a predictive model might under-represent the potential of minority students if it was trained on biased historical data. Mitigating such bias requires diverse development teams, regular audits of AI outputs, and policies that ensure equitable treatment of all learners.

Generative AI tools also raise questions about academic integrity and student autonomy. When students can use AI to generate essays or answers, plagiarism detection becomes more difficult. Educators must clarify rules for AI use: for instance, teaching students how to properly cite AI assistance and emphasizing the importance of their own critical thinking (National Education Association. 2025). All stakeholders agree that "human-in-the-loop" oversight is essential. In short, ethical use of AI in education demands that humans remain the ultimate guide, ensuring that AI supplements rather than overrides educators' professional judgment.

Looking forward, AI's role in education is expected to continue growing, but this expansion will hinge on careful policy and research. Many experts are calling for comprehensive guidelines and "education-specific AI policies" to protect students' rights and advance equity. Such policies should include standards for transparency (for example, clearly disclosing when content has been generated by AI) and accountability (such as auditing algorithms to detect bias) (Vilcarino, J. and Langreo, L., 2025). Governments and international organizations are already discussing AI principles in education; for instance, UNESCO emphasizes the importance of human-centered AI aligned with democratic values.

Professional development is another critical policy area. Education leaders recognize that realizing AI's benefits at scale requires training both teachers and students. Some school districts and technology companies have begun funding AI literacy programs. Continued investment in AI education – training for both pre-service and in-service teachers – will be necessary so that educators can integrate new tools effectively into their teaching practice.

Finally, equity must be central to future planning. Policymakers should ensure that all schools have access to AI resources – for example, through open-source tools or public funding – to avoid a situation where only affluent schools benefit from these technologies. Ongoing research will also be crucial: long-term studies are needed to determine whether AI truly improves learning outcomes across diverse student populations. By balancing innovation with thoughtful safeguards, the education system can use AI to support all learners.

AI is poised to transform education by enabling more personalized learning experi-

ences and automating routine tasks. Research shows considerable potential: adaptive AI can greatly improve student outcomes and engagement (Wang, S., Wang, F. and Zhu, Z., et al., 2024), and many teachers report that AI tools save them time and enhance the quality of their work. However, the impact of AI in education is complex and nuanced. Realizing the benefits depends on teachers' ability to use AI wisely and on addressing challenges such as equity, privacy, and academic integrity (Vilcarino, J. and Langreo, L., 2025). Clear ethical guidelines and policies are needed to ensure that AI complements human teaching rather than replacing it. In summary, AI offers powerful tools for education, but stakeholders must implement these tools thoughtfully – with attention to teacher training, transparency, and inclusion – if we are to achieve positive learning outcomes for all students.

Conclusion

Artificial intelligence holds substantial promise for transforming education by enabling personalized learning pathways, reducing teacher workload, and enhancing student engagement. However, its successful integration requires careful attention to ethical, equity, and policy considerations. To ensure that AI serves as a supportive tool rather than a replacement for human educators, stakeholders must prioritize teacher training, develop transparent and inclusive policies, and address potential biases and privacy risks. With thoughtful implementation and ongoing research, AI can contribute to a more adaptive, efficient, and equitable education system that benefits all learners.

References

Wang, S., Wang, F. and Zhu, Z., et al. (2024). 'Artificial intelligence in education: A systematic literature review', *Expert Systems with Applications*, – 252. – 124167 p.

Vieriu, A.M. and Petrea, G. (2023). 'The impact of Artificial Intelligence (AI) on students' academic development', *Education Sciences*, – 15(3). – 343 p.

Varsik, S. and Vosberg, L. (2024). *The potential impact of Artificial Intelligence (AI) on equity and inclusion in education*. OECD Artificial Intelligence Papers, – No. 23.

Ash, A. M. (2025). *Three in 10 Teachers Use AI Weekly, Saving Six Weeks a Year*. Gallup, 24 June.

National Education Association (2025). *Student and Educator Data Privacy*. NEA Policy Brief, 20 June.

Vilcarino, J. and Langreo, L. (2025). 'Rising use of AI in schools comes with big downsides for students', *Education Week*, 8 October.

submitted 07.12.2025;
accepted for publication 21.12.2025;
published 30.12.2025

Contact: alishov54@mail.ru

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

DOI:10.29013/EJEAP-25-4-8-15

TEACHING METHODOLOGY FOR MICROSOFT EXCEL WORKBOOK CREATION USING THE EXCEL OBJECT MODEL (VBA)

Bashirova Goncha Imanverdi giziv [1]

[1] Azerbaijan State Pedagogical University

Cite: *Bashirova G.I. (2025). Teaching Methodology for Microsoft Excel Workbook Creation Using the Excel Object Model (VBA). European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-8-15

Abstract

This article examines the object-oriented components of the Microsoft Excel Application Software System and provides foundational knowledge for establishing a programming interface between Visual Basic for Applications (VBA) and Excel. It is noteworthy that the Microsoft Excel Object Model (MEOM) displays certain differences from standard Object-Oriented Programming (OOP) paradigms. Programmers must consider these distinctions when developing application systems in the Excel and VBA environment. This study demonstrates how OOP mechanisms are implemented within MEOM and emphasizes its unique features. An Excel application file, referred to as a workbook, can be extensively manipulated through MEOM using VBA. The article introduces the primary components of MEOM that facilitate these operations and illustrates their application in practical procedures and functions.

Keywords: *MEOM, Delimiter, Editable, Converter, Notify, Origin, Corrupt Load, AddToMru.*

1. Introduction

Microsoft Excel is widely recognized as one of the most essential tools in modern business, academia, and data analysis. Beyond its familiar interface for spreadsheet calculations, Excel hosts a robust programming environment through Visual Basic for Applications (VBA), enabling users to automate tasks, develop custom functions, and build integrated application systems (Evensen, H.T., 2014). Central to this capability is the Microsoft Excel Object Model (MEOM)—a structured, hierarchical framework that exposes Excel's elements – such as workbooks, worksheets, ranges, charts, and even application-level settings – as programmable objects.

Unlike traditional object-oriented programming (OOP) environments, MEOM follows a slightly adapted model tailored to the spreadsheet paradigm, where objects often represent both data containers and interface elements. Understanding MEOM is fundamental for anyone seeking to move beyond manual Excel use into the realm of automated, scalable, and repeatable data processing. Through MEOM, developers can programmatically control every aspect of Excel – from creating and formatting workbooks to implementing complex data operations, applying security measures, and facilitating interaction between multiple files (Uwah, A., & Umoren, I., 2024).

This article focuses specifically on the methodology for workbook management using MEOM within VBA (Chaudhry, A. K., Kalwar, M. A., 2021). Workbook operations form the foundation of any Excel-based application, whether it is a simple macro or a comprehensive business system. We will explore how to programmatically create, open, activate, modify, save, and protect workbooks, with practical code examples and explanations of key object properties and methods. Additionally, we will discuss the role of the Workbooks collection in managing multiple open files and highlight best practices for implementing security in automated environments.

By mastering these techniques, programmers and analysts can transform static spreadsheets into dynamic, secure, and intelligent systems, significantly enhancing productivity, ensuring data integrity, and reducing human error. This guide aims to provide both a conceptual understanding and a practical reference for implementing workbook-level automation, serving as a stepping stone toward more advanced Excel-VBA integration and application development (Ebere, F. O., Ekwueme, H., 2024).

Before examining the technical details of each workbook operation, it is essential to understand the fundamental workflow of programmatic workbook management in Excel VBA. The Excel Object Model (MEOM) provides a structured approach to workbook automation, which can be visualized as a sequential process:

Diagram 1. *Core Workbook Operations Sequence in Excel VBA*

This simplified flowchart represents the seven essential stages of workbook manipulation through MEOM:

1. **Create** – Initialize new workbooks using Workbooks. Add
2. **Open** – Load existing files with Workbooks.Open or Open Text
3. **Activate** – Set workbook context via Workbook. Activate
4. **Write** – Input data using Range. Value or Cells properties
5. **Save** – Persist changes through Save, SaveAs, or Save Copy As
6. **Protect** – Apply security with Protect or Protect Sharing
7. **Close** – Terminate sessions using Close (True/False)

While this linear representation shows the basic progression, actual implementations often involve loops, conditional branching, and error handling to accommodate real-world scenarios such as batch processing, template-based generation, and multi-user environments. The subsequent sections of this article will explore each operation in detail, providing practical code examples and implementation guidelines.

2. Creating a Microsoft Excel Workbook

While Microsoft Excel provides an intuitive graphical interface for manual workbook creation, advanced users and developers often need to generate workbooks programmatically. This capability is essential for automation, batch processing, and integration with other applications. Through Visual Basic for Applications (VBA) and the Excel Object Model (MEOM), workbook creation becomes a flexible and controllable operation.

The fundamental approach to programmatic workbook creation in Excel VBA is through the Add method of the Workbooks collection. This method belongs to the Application.Workbooks object, which represents all open workbooks in the current Excel instance.

The basic syntax is: Application.Workbooks. Add

This minimalist command creates a single new workbook based on Excel's default template. The workbook receives an automatically generated name following the pattern "Book N.xlsx" (where N is a sequential number, e.g., Book 1.xlsx, Book 2.xlsx). The new workbook immediately becomes

the active workbook in the Excel application window.

In many practical scenarios, creating a workbook is followed immediately by saving it to a specific location with a designated filename. This can be accomplished by chaining the SaveAs method to the creation command.

Example with immediate save: Application.Workbooks. Add. Save As "My Workbook. xlsx"

This compound statement performs two operations: creates a new workbook and saves it to the active directory as "My Workbook. xlsx".

The SaveAs method offers extensive parameterization for enhanced control including file format specification (XLSX, XLS, CSV, etc.), password protection for opening and/or modifying, read-only recommendations, and access mode settings for shared environments (Mertz, D., 2021).

Extended example with parameters:

Dim new Workbook As Workbook

Set new Workbook = Application. Workbooks. Add new Work book. Save As Filename:="Financial Report. xlsx", Password:="secure 123", File Format: = xl Open XML Workbook, Create Backup:=False

For standardized reporting, formatted dashboards, or predefined corporate templates, Excel supports creation from custom template files. Templates (with extensions. xltx,.xltm, or.xlt) preserve structure, formatting, formulas, and even VBA code (Alexander, M., & Walkenbach, J., 2013).

Template-based creation: Application. Work books. Add "Corporate Template. xltx"

This command generates a new workbook that inherits all elements from the specified template. The template file must be accessible from the current working directory or a fully qualified path must be provided.

Example with full path: Application. Workbooks. Add "C:\Templates\MonthlyReport.xltm" Advanced creation scenarios include creating multiple workbooks programmatically using loops: Dim i As Integer For i = 1 To 5 Dim wb As Workbook Set wb = Application.Work books. Add wb. Save As "Report_" & i & ".xlsx" wb. Close Next i Excel also provides constants for built-in template types. For example, Application. Workbooks.Add creates a workbook with a single worksheet (default), while Application.Workbooks. Add, 3 creates a workbook with three worksheets. It is important to properly handle the created workbook object for subsequent operations. The Add method returns a Workbook object reference that can be stored in a variable for later manipulation: Dim newBook As Workbook Set newBook = Application.Workbooks. Add Additional operations on newBook newBook.Worksheets (1).Range ("A1"). Value = "Report Title" newBook. Save As "Final Report. xlsx" The programmatic creation of workbooks represents the foundation of Excel automation, enabling developers to build sophisticated data processing systems, automated reporting tools, and integrated business applications within the familiar Excel environment.

3. Opening a Microsoft Excel Workbook

A workbook can be opened programmatically in two primary ways:

1. Using Excel's Built-in Dialog:

vba

Application.Dialogs.Item(xlDialogOpen). Show

This displays the standard Open File dialog to the user.

2. Using the Open **Method (Direct):**

vba

Application.Workbooks.Open Filename:="MyBook.xls"

This is the most straightforward method for opening a known file.

Excel can also import and convert structured text files. The OpenText method is used for this purpose. The following example opens a tilde-delimited text file:

vba

```
Workbooks.OpenText Filename:="101TB.txt", _
Origin:= –535, _
StartRow:=1, _
DataType:=xlDelimited, _
TextQualifier:=xlDoubleQuote, _
Other:=True, _
OtherChar:="~", _
FieldInfo:=Array(Array (1, 1), Array (2, 1), Array (3, 1), Array (4, 1)), _
TrailingMinusNumbers:=True
```

This code, which can be generated using Excel's Macro Recorder and then simplified,

creates a new workbook "101TB.txt.xls", places the data on a worksheet, and populates cells A1: D6 with the records from the text file.

3.1. Syntax of the MEOM Open Method

The Open method has a comprehensive set of optional parameters:

expression.Open(FileName, UpdateLinks, ReadOnly, Format, Password, WriteResPassword, IgnoreReadOnlyRecommended, Origin, Delimiter, Editable, Notify, Converter, AddToMru, Local, CorruptLoad)

CorruptLoad Parameter

Description:

This parameter determines how Excel should load a corrupted or damaged file**.** It controls Excel's behavior when a file reading error occurs during opening.

Values and Meanings:

Table 1.

Value	Constant Name	Description
1.	xlNormalLoad	Performs normal loading. Returns an error if the file is corrupted.
2.	xlRepairFile	Attempts to repair the file; if unsuccessful, extracts data from it.
3.	xlExtractData	Extracts only data from the file, ignoring formatting and other features.

Example Usage:

vba

' Open corrupted file with repair attempt:

Workbooks. Open File Name:="corrupted_file. xlsx", Corrupt Load:=xlRepair File

' Open with data extraction only:

Work books. Open File Name:="corrupted_file.xlsx", Corrupt Load:=xl ExtractData

When to Use:

- When suspecting file corruption
- In data recovery scenarios
- When accepting format loss to access critical data

AddToMru Parameter

Description:

AddToMru (Most Recently Used) controls whether the opened file should be added to Excel's "Recent Files" list.

Values:

- True: File is added to MRU list
- False: File is NOT added to MRU list (default)

Example Usage:

vba

' Open file and ADD to MRU list:

Workbooks. Open File Name:="report. xlsx", Add To Mru: = True

' Open file but DO NOT add to MRU list:

Workbooks. Open File Name: ="temp. xlsx", Add To Mru: =False

When to Use:

- Add To Mru: = False → Temporary files, automation-generated reports, hidden data files
- Add To Mru:= True → Frequently used templates, main data files, files requiring easy user access

Notify Parameter

Description:

This parameter controls Excel's user notification mechanism when a file is locked (being used by someone else or another program).

Values:

- True: If file is locked, it›s added to a «notification list.» Excel alerts the user when the file becomes available.
- False: Notification mechanism is disabled (default).

Example Usage:

vba

' Get notification if file is locked:

Workbooks. Open File Name:= " shared. xlsx", Notify: =True

' No notification required:

Work books. Open File Name:= " local. xlsx", Notify:= False

How It Works:

1. Attempt to open the file
2. If file is locked (opens in read-only mode)
3. If Notify:=True, file is added to "notification list"

4. When file becomes available, Excel shows a message in status bar or plays alert sound

When to Use:

- Notify:= True → Network shared files, multi-user environments
- Notify:=False → Local files, single-user environments, automation scripts

Comparison Table

Table 2.

Parameter	Default	Recommended Use	Performance Impact
Corrupt Load	xlNormal Load	When data recovery is needed	High (repair is resource-intensive)
Add To Mru	False	False for temp files, True for permanent files	Low
Notify	False	True for shared files, False for local files	Medium (background monitoring)

Expression – Required parameter. Returns a Workbooks object. This provides a reference to either the Workbooks collection or a single Workbook object.

File Name – Required String parameter. Specifies the complete file path of the file to be opened. Example: "C:\MyDocuments\report.xlsx".

Update Links – Optional parameter. Specifies how to update external links. Accepts values between 0 and 3. 0: do not update links, 1: update external links, 2: update remote links, 3: update both external and remote links.

Read Only – Optional Boolean parameter. Determines whether the workbook should be opened as read-only. A value of True opens the file in read-only mode.

Format – Optional parameter. Specifies the delimiter to be used for text files. Accepts values from 1 to 6: 1 (tab), 2 (comma), 3 (space), 4 (semicolon), 5 (none), 6 (custom character).

Password – Optional String parameter. Specifies the password required to open a password-protected workbook.

Write Res Password – Optional String parameter. Specifies the password required for write access. This password grants permission to modify and save the file.

Ignore Read Only Recommended – Optional Boolean parameter. Determines whether the "read-only recommended" prompt should be displayed if the file was saved with this setting. A value of True suppresses the warning.

Origin – Optional parameter. Specifies the platform origin of a text file. Common values include: xlMacintosh (for Macintosh), xlWindows (for Windows), and xlMSDOS (for MS-DOS). This parameter is important for correctly interpreting text encoding and line endings.

Delimiter – Optional String parameter. Specifies a custom delimiter character to be used when Format is set to 6 (custom). This allows importing text files with non-standard separators.

Editable – Optional Boolean parameter. Originally used for Excel 4.0 add-ins, this parameter is largely obsolete in modern Excel versions. It was designed to control whether add-ins should be opened as editable.

Notify – Optional Boolean parameter. Controls whether Excel should add a file to a notification list if it is locked by another user or application. When True, Excel monitors the file and notifies the user when it becomes available.

Converter – Optional parameter. Specifies the index of the file converter to use when opening files in non-native formats. This is useful for opening files created in other spreadsheet applications or legacy formats.

Add To Mru – Optional Boolean parameter. Determines whether the opened file should be added to Excel's Most Recently Used (MRU) file list. True adds the file to the list, False excludes it from the list.

Local – Optional Boolean parameter. Controls the language context for saving files. When True, files are saved in the language of Excel; when False, files are saved in the lan-

guage of VBA. This affects date formats, function names, and other locale-specific settings.

CorruptLoad – Optional parameter. Specifies how Excel should handle potentially corrupted files. Accepts three values: xlNormalLoad (normal loading with error if corrupted), xlRepairFile (attempt to repair the file), and xlExtractData (extract data only, ignoring formatting and formulas).

4. Activating a Microsoft Excel Workbook

When multiple workbooks are open, specific references are required. Activation can be done directly or by explicitly activating a workbook.

- Direct Reference Form:

vba

```
Workbooks("Kitab1.xls").Worksheets("Sehife1").Cells(1, 1) = "This book name is Kitab1.xls"
```

- Activation Form (Useful when switching active context):

vba

```
Application.Workbooks("Kitab1.xls").Activate
ActiveWorkbook.Worksheets("Sehife1").Cells(1, 1) = "This book name is Kitab1.xls"
```

After activation, the ActiveWorkbook object can be used for concise references. Navigation between workbooks must be managed carefully by the programmer.

5. Writing Information to a Microsoft Excel Workbook

Data can be written to cells by referencing the appropriate workbook, worksheet, and range. The following example demonstrates opening a password-protected workbook, writing data to specific cells, and closing it.

vba

```
Sub e_Open Book_With_Write Info()
Application. Workbooks. Open Filename:= "My Book. xls", Password:= "bla-bla"
With Workbooks("MyBook.xls"). Worksheets(1)
Cells(1, 1) = "This book name:"
Cells(1, 2) = "MyBook.xls"
Cells(2, 1) = "Loads count this book:"
Cells(2, 2) = 0 'Intended as a counter for future use
End With
Application.Workbooks("MyBook.xls"). Close (True)
End Sub
```

Line 02: Opens the workbook «MyBook. xls» using the password «bla-bla".

Line 03: Sets the target object to the first worksheet of the opened workbook.

Lines 04–07: Writes information into four cells. Cell (2,2) is initialized as a counter.

A subsequent procedure can modify this data:

vba

```
Sub e_Open Book_With_ChangeInfo()
Application. Workbooks. Open Filename:="My Book. xls", Password:= "bla-bla"
With Workbooks ("My Book. xls"). Worksheets (1)
.Cells(2, 2) =.Cells(2, 2) + 1 'Increments the counter
End With
Application.Workbooks("MyBook.xls"). Close (True)
End Sub
```

6. Saving a Microsoft Excel Workbook

MEOM provides methods corresponding to Excel's "Save" and "Save As" operations.

- Save **Method:** Saves the workbook to its known location.

vba

```
Application.Workbooks("MyBook1.xls"). Save
```

- Save Copy As **Method:** Saves a copy of the workbook without affecting the original open file.

vba

```
Application. Workbooks("My Book. xls"). SaveCopyAs ("Copy_MyBook_" & Int(Timer) & ".xls")
```

Example procedure:

vba

```
Sub e_Open Book_With_Save()
Application. Workbooks. Open Filename:= "My Book1. xls"
With Workbooks ("My Book1. xls"). Worksheets (1)
Cells(2, 2) =.Cells(2, 2) + 1
End With
Application.Workbooks("My Book1.xls"). Save
Application.Workbooks("My Book1.xls"). Close
End Sub
```

Note: The Close(True) method automatically saves changes, making an explicit Save call redundant in many cases, which programmers use to write more compact code.

7. Closing a Microsoft Excel Workbook

The Close method of the Workbook object is used. Its behavior depends on the parameter and the workbook›s state:

- Close(True)**:** Saves all changes and closes the workbook.
- Close(False)**:** If changes exist, Excel displays a dialog prompting the user to save. If no changes exist, it closes immediately.
- Close **(no parameter):** Behaves like Close(False).

In automated systems, the save/close logic is typically handled by the program (e.g., Close(True)) to avoid user interaction.

8. Working with the Workbooks Collection

The Workbooks collection is vital for managing multiple open workbooks within an application.

- *Listing All Open Workbooks***:**

vba

```
For Each obj In Workbooks
Debug. Print obj. Name
Next
```

- *Checking if a Specific Workbook is Open:*

vba

```
Sub e_Workbooks_CheckObject()
sFile = “My Book.xls”
bFind = False
For Each obj In Workbooks
If obj.Name = sFile Then
bFind = True
Exit For
End If
Next
If bFind Then
Msg Box (sFile & “ is loaded”)
Else
Msg Box (sFile & “ is not loaded”)
End If
End Sub
```

- *Saving and Closing All Open Workbooks:*

vba

```
For Each obj In Workbooks
obj.Close (True)
Next
```

9. Implementing Protection for a Microsoft Excel Workbook

MEOM allows for the programmatic control of Excel’s security features.

- Creating a Password-Protected Workbook:

vba

```
Application. Workbooks. Add. Save As Filename:=”My Book New. xls”, Password:=”12345”
```

- Opening a Password-Protected Workbook:

vba

```
Application. Workbooks. Open Filename:=”My Book. xls”, Password:= ”12345”
```

- Protecting Workbook Structure (Prevents adding/deleting/moving sheets):

vba

```
Application. Workbooks (“Other1.xls”). Activate
Active Workbook. Protect Password:= ”12345”, Structure:= True, Windows:= False
```

To unprotect:

vba

```
Active Workbook. Unprotect Password:= ”12345”
```

- Enabling Shared Workbook Protection (Network):

vba

```
Application.Workbooks(“Other2.xls”). Activate
Active Workbook. ProtectSharing Filename:= ”Other2.xls”, Sharing Password:= ”12345”
```

To disable sharing protection:

vba

```
ActiveWorkbook.UnprotectSharing SharingPassword:=”12345”
```

Conclusion

Programmatic control of Microsoft Excel through VBA and the Excel Object Model (MEOM) is a cornerstone of office automation and application development. This article provided a methodological overview of core workbook operations – creation, opening, activation, data manipulation, saving, closing, collection management, and protection. By leveraging these techniques, developers can transition from manual spreadsheet use to

building sophisticated, automated data processing systems that enhance productivity, ensure accuracy, and provide tailored business solutions within the familiar Excel environment.

The content presented here focuses primarily on foundational and intermediate-level workbook management, deliberately laying a solid groundwork for beginners and intermediate users. However, real-world Excel-VBA applications often require more advanced capabilities to create robust, maintainable, and responsive systems. Future work could extend this methodology to cover deeper topics such as:

- Event handling: Implementing workbook, worksheet, and application-level events (e.g., Workbook_Open, Worksheet_Change, BeforeSave) to build reactive and interactive applications that respond automatically to user actions or data changes;
- Custom classes and object-oriented design: Creating user-defined classes to encapsulate complex objects (e.g., custom data structures, reusable components) and fully exploit OOP principles within the VBA environment;
- Comprehensive error handling: Advanced techniques using On Error GoTo, Err object, custom error classes, and structured exception management to make automation scripts resilient against file corruption, user errors, network issues, or unexpected data conditions;
- Integration with external systems: Connecting Excel to databases (ADO/DAO), web APIs, or other Office applications for dynamic data import/export;
- Performance optimization and user forms: Efficient handling of large datasets, array-based operations, and development of professional user interfaces with custom forms and controls.

Exploring these advanced areas would enable the development of enterprise-grade Excel-based tools, further bridging the gap between simple automation and full-fledged application development. Researchers and practitioners are encouraged to build upon this foundation to address more complex automation challenges in business intelligence, scientific computing, and data analytics domains.

References

Alexander, M., & Walkenbach, J. (2013). Excel dashboards and reports.

Chaudhry, A. K., Kalwar, M. A., Khan, M. A., & Shaikh, S. A. (2021). Improving the Efficiency of Small Management Information System by Using VBA. International Journal of Science and Engineering Investigations, – 10(111). – P. 7–13.

Ebere, F. O., Ekwueme, H., Onwuama, C. N., Adu-Mensah, D., Nkok, L., & Josephs, R. (2024). Advancing Reservoir Performance Optimization through User-Friendly Excel VBA Software Development. Petroleum & Petrochemical Engineering Journal, – 8(1). – P. 1–20.

Evensen, H. T. (2014, June). A versatile platform for programming and data acquisition: Excel and Visual Basic for Applications. In 2014 ASEE Annual Conference & Exposition (P. 24–125).

Mertz, D. (2021). Cleaning data for effective data science. Packt Publishing.

Uwah, A., & Umoren, I. (2024). Soft Computing-Based System for Performance Modeling of Object-Oriented Programming (OOP) Software. European Journal of Computer Science and Information Technology, – 12(2). – P. 22–40.

submitted 07.12.2025;
accepted for publication 21.12.2025;
published 30.12.2025

Contact: qoncabashirova@yahoo.com

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

DOI:10.29013/EJEAP-25-4-16-19

EXPLORING OBJECT ORIENTED PROGRAMMING AND MICROSOFT EXCEL'S OBJECT MODEL

Bashirova Goncha [1]

[1] Azerbaijan State Pedagogical University, Baku

Cite: *Bashirova G. (2025). Exploring Object Oriented Programming and Microsoft Excel's Object Model. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-16-19

Abstract

Relevance of the article. Currently, programming is widely used in all areas of human activity. This article is dedicated to teaching how to create effective software systems using the full capabilities of Algorithmic Language. Scientific novelty of the article. It explains the principles of creating effective software systems by fully using the capabilities provided by the Algorithmic Language. Practical significance and application of the article. Informatics teachers and people conducting research in this field can use the materials presented in the article.

Keywords: *Encapsulation, Inheritance, Polymorphism, Borders, Border objects*

In this article, we will study the object-type components of Microsoft Excel Application Software System, and gain the necessary knowledge to create a programming interface between VBA and Microsoft Excel. First of all, it should be noted that the Object Model of Microsoft Excel is slightly different from the standard Ob UserForm class ject oriented programming meanings considered in modern programming, and the programmer must take these differences into account when implementing Application Software System projects in the Excel&VBA environment.

First, let's get acquainted with the class and its derived object meanings.

1) A class is a type belonging to a certain structure. Unlike other types (intrinsic and user), the components of data/objects declared or created with it can be primitive type data/properties and function/method. One-to-one reference to these components is impossible, and all references are possible through the identifier of the object(s) derived from the class.

2) The given object declared and initialized through the class is called.

Modern algorithmic languages Object Oriented Programming have differences in the implementation of Object oriented programming. Algorithmic languages like Java, C++, C# are considered Standard Object oriented programming. Standard Object Oriented Programming has 3 main meanings:

Encapsulation
Inheritance
Polymorphism

Encapsulation

This meaning refers to the set of features and functions of the object. Vehicle features

(seat, seat color, front and rear windows, doors and door glass, etc.) and functions (engine start, wheel rotation, windows down/up, etc.) are encapsulated (i.e. bundled together) into a vehicle object. In this case, any object component (be it a property or a module) is referred to as a component of the object rather than a single object.

|| ekt.komponent[(parametr1,...)]

where, a component can be a property or a method. If a component is a method/function, then it can have certain parameters/arguments.

For example, several UserForm objects can be created from the UserForm class, one of VBA's control components. Even if these objects derive from the same class and have properties and methods with the same name, they are distinct and can be referenced/referenced only from the object itself/identifier:

|| User Form 1. Back Color = RGB(255, 0, 0)' UserForm1 change the BackColor property of the object

|| User Form1. Show ' UserForm1 call the object's Show method

where the **User Form 1** object is derived from the **UserForm class**

Inheritance

New car objects (eg Mercedes, Nissan, Volvo, etc.) can be created by adding new properties and functions to an abstract car (4-wheeled, moving, steering, body, etc.) object. Newly created objects derive from the abstract car object and inherit this viewpoint. This meaning is not implemented in VBA. So, VBA does not derive a new class from any class. That is, the components of any class cannot be imported into another class. Therefore, if the presence of any component is necessary, then this component must be physically added to the new class. The following construct implemented in AD such as Java, C++, C#, PERL, PHP cannot be implemented in VBA:

|| class B extends A {...}

where class B derives from A and retains the components of class A

Polymorphism

Objects can perform essentially the same functions. For example, although the function of opening doors in a car is essentially the same, their realizations may differ (right, up, left, sliding, etc.). This is called polymorphism.

A collection is an object that is a collection of objects of the same type. There is too much information about all collections/objects and their components (properties and methods). For this reason, let's explore one of the most commonly used objects, CellFormat.

The CellFormat object belongs to the Application object and holds the following collections and objects as properties:

- **Borders (collection). Border objects belong to this collection.**
- **Font (object)**
- **Interior (object)**

CellFormat.e_CellFormat_Borders_Properties (initial code)

```
|| 01 Sub e_CellFormat_Borders_Properties()
|| 02 Dim oB
|| 03 Set oB = Worksheets(«S1»).Range(«C5: F15»).Borders
|| 04 oB.LineStyle = xlDouble 'const. xlContinuous, xlDash, xlDashDot, xlDashDotDot, xlDot, xlDouble, xlSlantDashDot, xlLineStyleNone
|| 05 oB.Value = xlDashDot
|| 06 oB.Weight = xlMedium 'const. xlHairline, xlThin, xlMedium, xlThick
|| 07 oB.Color = RGB(0, 0, 255)
|| 08 oB.ColorIndex = 35
|| 09 oB.Item(xlEdgeBottom).Color = RGB(255, 0, 0)
|| 10 Debug.Print oB.Application 'res. Microsoft Excel
|| 11 Debug.Print oB.Count 'res. 6
|| 12 Debug.Print oB.Creator 'res. 1480803660
|| 13 oB.Parent.Name = «x» '??????
|| 14 Debug.Print oB.Parent.Name 'res. 'S1'!$C$5:$F$15
|| 15 Debug.Print oB.Parent.Row 'res. 5
|| 16 Debug.Print oB.Parent.Rows.Count 'res. 11
|| 17 Debug.Print oB.Parent.Column 'res. 3
|| 18 Debug.Print oB.Parent.Columns.Count 'res. 4
|| 19 End Sub
```

CellFormat.e_CellFormat_Borders_Properties (comment)

- **Line 02**. We declare a variable called oB;
- **Line 03**. We assign an expression composed of objects and collections to the variable oB. Then oB becomes an object that defines the borders (via the Borders collection) of cells C5: F15 of page S1 and has all the properties of the Borders collection;
- **Line 04**. We assign the xlDouble constant to the LineStyle property of the oB object. This means delimiting the actual displayed cells with a double line. Instead of the xlDouble constant, we can draw the boundaries in a different way, using the other 7 constants;
- **Line 05.** We assign the xlDashDot constant to the Value property, which is an alternative to the LineStyle property of the oB object. This means that the actual displayed cells are bordered by a dotted line;
- **Line 06.** We assign the xlMedium constant to the Weight property of the oB object. This means determining the thickness of the boundary lines. It is necessary to use one of the 4 constants that determine the thickness of the line;
- **Lines 07–09.** We define the color of the oB object using one of the alternative properties Color, ColorIndex, Item(xxx).Color;
- **Line 10**. The Application object is used as a property to indicate which system the oB object belongs to. This feature is especially important when working with variables derived from objects belonging to different systems. In line 10, we specify that the object oB belongs to the Microsoft Excel system;
- **Line 11**. It's hard to understand what the Count property on the oB object does. The information in the help system is not enough to clarify this. Also, the Border object, which is the only object in the Borders collection, does not have this property. The Count property on lines 16 and 18 specifies the number of rows and columns, respectively. This naturally makes sense. But the fact that the result of the 11th line has 6 numbers remains unknown. In my opinion, this indicates the possible number of lines used to delimit the cell: 4 sides and 2 diagonal lines. In all cases, this should be considered an error by the programmers who created VBA. Information about what this feature serves in a specific case (ie, Borders collection) should be reflected in the appropriate Help system article;
- **Line 12**. The Creator property of the oB object returns a specific number (1480803660). This property is intended for use on the Macintosh operating system and specifies that the oB object belongs to the Microsoft Excel system;
- **Line 13**. The Name of the Parent property of the oB object is initialized. Without it, lines 14–18 are not executed. This feature contains a bug (BUG). So if oB.Parent.Name = «x» is defined on line 13, then on line 14 the oB.Parent.Name property returns ='S1'!$C$5:$F$15!!!
- **Line 14**. The Name of the Parent property of an oB object returns the name of the object;
- **Line 15.** The Row of the Parent property of the oB object returns the row number (5) of the first row of the object;
- **Line 16**. Rows.Count of the Parent property of the oB object returns the number of rows (11) of the object;
- **Line 17.** The Column of the Parent property of the oB object returns the sequence number (3) of the object's first column;
- **Line 18.** The Columns.Count property of the oB object's Parent returns the object's number of columns (4).

References:

Partyka T. L., Popov I. I., Golitsyna O. L. Programming Languages. – Moscow: Forum Infra, 2008. – 400 p.
Sommerville I. Software Engineering. DialecticaWilliams Publishing Group, 2002. – 624 p.
Graham I. Object-Oriented Methods: Principles and Practice. 3rd ed. Moscow: Williams, 2004. – 880 p.
Pyshkin E. V. Basic Concepts and Mechanisms of Object-Oriented Programming. BHV-Saint Petersburg, 2005. – 640 p.
Ivanova G. S., Nichushkina T. N., Pugachev E. K. Object-Oriented Programming. Bauman Moscow State Technical University, Moscow N. E. Bauman, 2007. – 316 p.
Ken Getz, Mike Gilbert. Programming in Microsoft Office: The Complete Guide to VBA.

submitted 06.11.2025;
accepted for publication 20.11.2025;
published 30.12.2025

Contact: qoncabashirova@yahoo.com

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

DOI:10.29013/EJEAP-25-4-20-23

THE CONCEPT AS THE BASIC UNIT OF LINGUOCULTUROLOGY

Kadirova Nilufar Rustamovna [1]

[1] Uzbekistan National Pedagogical University, Uzbekistan, Tashkent

Cite: *Kadirova N.R. (2025). The Concept as the Basic Unit of Linguoculturology. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-20-23

Abstract

This article is devoted to the linguistic and cultural approach to the study of the concept. The main aspects of this approach, including its concept, classification, methods of conceptual analysis, as well as its application in various fields is considered. The study of the concept can reveal the richness and diversity of culture and serve as a guide for the development of the field of linguoculturology.

Keywords: *conceptual analysis, classification, methods, linguocultural approach, concepts reflecting cultural values, concepts reflecting traditions, concepts reflecting customs, basic principles, linguacultural approach, significance, cultural characteristics, mentality of people*

Introduction

The linguocultural approach to the study of a concept is an important area of research in modern linguoculturology, which is a methodological approach to language learning based on the relationship between linguistic phenomena and the cultural characteristics of the people who speak this language. It is aimed at analyzing concepts reflecting cultural values, traditions and customs. In this article, we will consider the basic principles and methods of the linguacultural approach to the study of the concept, as well as its significance for understanding the cultural characteristics and mentality of people.

Analyzing research in the field of cultural linguistics in recent years, we find that the cultural concept is currently flourishing due to several reasons.

First, there is the rapid globalization of world problems, which requires taking into account differences in the behavior and communication of different peoples in order to avoid cultural misunderstandings.

Secondly, the integration of the humanities, which helps linguists better understand the relationship between language and culture.

Finally, there is the applied aspect of linguistic knowledge, which makes it possible to use language to understand collective experience and its application in advertising, politics and mass media. One of the main units of linguoculturology is the “concept” – “a multidimensional semantic education in which the value, figurative and conceptual sides are distinguished” (Karasik V. I., 2002, p. 91). Concept, as an important concept in linguoculture, refers to words that carry special cultural connotations and conceptual mean-

ings. These words are not only symbols of language, but also native speakers of culture, reflecting the perception and understanding of the world by a particular nation.

Method

Different linguocultural scholars classify concepts in different ways. Some researchers distinguish concepts by their connection with certain linguistic units, others classify them by spheres of cultural life, and others base the classification on the features of cognitive organization. In this paper, we will consider the classification of concepts by V. A. Maslova. The scientist gives the following typologization of concepts for various reasons: from the point of view of thematics, concepts form various spheres, such as emotional, educational, textual and others.; According to their media, they can be individual, microgroup, macrogroup, national, civilizational or universal; concepts can also be associated with various discourses, such as pedagogical, religious, political, medical, etc. (Maslova V. A., 2006, p. 56).

V. A. Maslova's approach to the classification of concepts, taking into account their various aspects and interrelations, is very productive for the analysis of cultural phenomena. Due to the many different schools in linguoculture, scientists differ not only in the categorization of concepts, but also in the methods of their study. Review of linguistic research on the concept has shown that in modern linguoculture there are many methods for studying concepts that can be grouped into two main categories: "synchronic method of conceptual analysis" and "diachronic method of conceptual analysis" (Maslova V. A., 2006. p. 41).

One representative of the synchronic method of conceptual analysis is A. Vezhbitskaya. She suggests considering concepts "as tools of cognition of external reality, which should be described by means of language in the form of some explanatory constructions" (Vezhbitskaya A., 1999, p. 33). This approach can be called logical-conceptual. A. Vezhbitskaya argues that most people have similar ideas about semantic information. To describe the "ideal image" of a word, it is necessary to study the linguistic consciousness of speakers, and not the external world with real objects.

A. Maslova notes that several trends have taken shape in linguoculturology to date: Linguoculturology of a particular social group or ethnic group in a culturally vivid period, i.e. the study of a specific linguistic and cultural situation. Diachronic linguoculturology, i.e. the study of changes in the linguistic and cultural state of an ethnic group over a certain period of time.

Result

Comparative linguoculturology, which studies the linguistic and cultural manifestations of different but interrelated ethnic groups. Comparative linguoculturology. It is just beginning to develop. Linguistic and cultural lexicography, which compiles linguistic and cultural dictionaries. It seems that the basis of the categorical apparatus of linguoculturology consists of the concepts of linguistic personality, concept and linguistic cultural type, the epistemological formation of which is still, apparently, not fully completed.

According to V. A. Maslova, a person creates culture and lives in it. It is in personality that the social nature of man comes to the fore, and man himself acts as a subject of socio-cultural life.

Currently, the linguistic and cultural approach to the study of the concept has already found application in various fields, including education, translation, intercultural communication and cultural analysis. The use of a linguistic and cultural approach in education contributes to a deeper understanding of the languages and cultures of different countries, which contributes to the formation of tolerance and intercultural understanding among students.

In the field of translation, the linguocultural approach helps to preserve the cultural specificity of the original when translating texts, which is especially important when working with literary works and texts containing cultural references. In intercultural communication and cultural analysis, the linguistic and cultural approach allows for a deeper understanding of the perception and interpretation of information in different cultures, which contributes to effective interaction between representatives of different cultural communities.

In cognitive linguistics, the promising direction in semantics is that which defends

the ideas of the opposition of the conceptual level to the semantic (linguistic) one. Put forward by M. Birvish and supported by his colleagues, these ideas have already been embodied in the so-called two-level theory of meaning. It seems that this monograph by A.Vezhbitskaya serves as a vivid proof of how certain universal (if not universal) concepts are grouped in different ways and verbalized in different languages in close dependence on linguistic, pragmatic and cultural factors proper, and, consequently, are fixed in different meanings (Kubryakova, 1996, 90–93).

According to V. A. Maslova, the concept has a complex structure. On the one hand, everything that belongs to the structure of the concept belongs to it; on the other hand, the structure of the concept includes everything that makes it a fact of culture – the original form (etymology); history compressed to the main features of the content; modern associations; assessments, etc. (Maslova, 2001, p. 40).

R. I. Pavlenis believes that to assimilate a certain meaning (concept) means to build a certain structure consisting of existing concepts as interpreters, or analyzers, of the concept under consideration, which is "introduced" – from an external point of view, that is, from the point of view of some observer outside the system – into the system of concepts being constructed in this way (Pavilionis, 1983, p. 101–102).

Z. D. Popova and I. A. Sternin, having analyzed many definitions of the concept, came to the conclusion that the cognitive concept is formed in the human mind from:

a) his direct sensory experience – perception of the world by the senses;

b) objective human activity;

c) mental operations with concepts already existing in his mind;

d) from linguistic communication (the concept can be communicated, explained to a person in a linguistic form;

e) through conscious cognition of linguistic units (Popova and Sternin, 2001, p. 40).

Taking as a basis the structure of the concept according to Stepanov, we believe that V. I. Karasik's point of view on the layers of the concept highlighted by Yu. S. Stepanov also deserves attention. He suggests considering them as separate concepts of different volumes, rather than as components of a single concept. The active layer ("the main relevant feature known to every cultural carrier and significant to him") is included in the national concept, passive layers ("additional features relevant to specific groups of cultural carriers") belong to the conceptual spheres of individual subcultures, the internal form of the concept ("not realized in everyday life, known only to to specialists, but defining the external, iconic form of expression of concepts") for most cultural speakers is not a part of the concept, but one of its determining cultural elements (Karasik, 1996, p. 43).

In **conclusion**, it can be noted that the linguocultural approach to the study of the concept allows us to better understand the relationship between language and culture, as well as expand our understanding of the world through the prism of various linguistic and cultural contexts. The study of concepts based on a linguistic and cultural approach contributes not only to an in-depth understanding of cultural values and traditions, but also to the development of intercultural dialogue and mutual understanding. Thus, the linguistic and cultural approach to the study of the concept plays an important role in promoting cultural exchange and harmonious coexistence of different cultures and peoples. This approach is an important tool for promoting cultural diversity, respecting differences, and building harmonious relationships between different cultures.

References:

Vezhbitskaya A. Semantic Universals and Description of Languages. – Moscow: RADD, 1999. – 212 p.

Vezhbitskaya A. Understanding Cultures through Keywords. / Translated from English by A. D. Shmeleva. – Moscow: Languages of Slavic Culture. 2001. – 288 p.

Karasik V. I. Language Circle: Personality, Concepts, Discourse. – Volgograd: Peremena, 2002. – 477 p.

Maslova V. A. Introduction to Cognitive Linguistics: A Textbook. – Moscow: Flinta: Nauka, 2006. – 296 p.
Popova Z. D., Sternin I. A. Essays on Cognitive Linguistics. – Voronezh, 2001. – 192 p.
Stepanov, Yu. S. Constants. Dictionary of Russian Culture. – Moscow: School "Languages of Russian Culture," 1997. – 824 p.
Stepanov, Yu. S. Constants: Dictionary of Russian Culture: 2nd ed., corrected and enlarged. – Moscow: Academichesky Proekt, 2001. – 990 p.

submitted 20.10.2025;
accepted for publication 04.11.2025;
published 30.12.2025

Contact: science_7777@mail.ru

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

DOI:10.29013/EJEAP-25-4-24-27

THEORETICAL FOUNDATIONS OF PROFESSIONALLY–ORIENTED ENGLISH LANGUAGE TEACHING FOR LAW FACULTIES

Mirgiyazova Munisa Mirusmanovna [1]

[1] Uzbekistan National Pedagogical University, Uzbekistan, Tashkent

Cite: *Mirgiyazova M.M. (2025). The Oretical Foundations of Professionally – Oriented English Language Teaching For Law Faculties. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-24-27

Abstract

The expansion of international contacts and the visibility of prospects for a specialist who speaks a foreign language create favorable conditions for raising the prestige of the subject "foreign language" in all educational institutions. In this regard, the issue of improving the quality of the educational process in foreign languages and the search for new, more effective methods and techniques for teaching law students is particularly acute.

Keywords: *importance of foreign language proficiency, legal profession, learning conditions, non-linguistic faculties, professional training, effective methods, techniques, reading instruction, oral language, intended goals, learning conditions*

Introduction

At the law faculties of universities, a foreign language is provided for two hours a week in the first and second years of study. Group occupancy is common, as for all specialties (10–12 people). Given the relentless growth of the importance of foreign language proficiency in the legal profession, these learning conditions can be described as extremely difficult. And even the growing importance of the subject for professional training has not yet been reflected in the improvement of these conditions, which complicates the solution of those basic issues that have always faced and are facing methodologists who study the problems of teaching foreign languages at non-linguistic faculties in non-linguistic universities.

The first of these problems is the correlation and correlation of general language training with special, that is, professionally oriented training. It is important to determine what their specific weight should be in comparison with each other, whether a strict division between these two components is needed at all, and whether it is more effective to start special professionally oriented training.

The second problem is the relationship between reading instruction and oral language instruction in non-linguistic faculties. As you know, for many decades, the main purpose of teaching foreign languages at a non-linguistic faculty was considered to be teaching reading texts in the specialty, and it was only during the last decades, or rather in the 60s of the XX century, that oral speech as a learning goal gradually gained territory in a non-linguistic university. Taking into account that, on the one hand, the learning

conditions have not improved, and on the other hand, no one now questions the focus of teaching a foreign language both on communication in the general field of activity and in professional, and no one denies the need to teach students not only reading, but also oral speech, then the question arises whether it is even possible to achieve the intended goals in these learning conditions.

There are a number of factors that to some extent compensate for the negative impact of what Michael West would call "Teaching English in difficult circumstances" (Tiersma P. M., 1999, p. 112). These factors are as follows:

– First, despite all the critical attitude towards school teaching of foreign languages, it is necessary to recognize that the level of preparedness of graduates entering law faculties is much higher today than it was when the main problems of teaching foreign languages in non-linguistic faculties were raised.

The data on the readiness of first-year students to understand authentic texts on jurisprudence, which we have received in repeated inspections over the past years, is generally very encouraging.

– secondly, a student who has entered the Faculty of Law has a high motivation to learn a foreign language, moreover, about % of students realize that a career as a lawyer without knowledge of foreign languages, especially English, is less promising. And this external motivation is already of great importance.
– The third one is undoubtedly the existing difference between non – linguistic specialties in terms of the degree of ease of reading special texts. This difference affects, first of all, the degree of proximity (or remoteness) of special terms and general vocabulary; the level of pre-university awareness of trainees about the chosen specialty and its basic concepts is essential. In this regard, law is a relatively "profitable" specialty. Characters of jurisprudence, legal plots, designations of jurisprudence
– these terms are largely internationalized, and there is a very high percentage of words and phrases that are both terms and units of a common language. Jurisprudence undoubtedly belongs to those sciences whose English terminology is difficult, primarily because of its ambiguity, and not because of its isolation from the general vocabulary.
– the fourth important factor is the proximity of jurisprudence to the life of an ordinary person. "Law and justice stand in the middle of life."

They regulate it, and hence the ease of saturating general language training with elements of a legal specialty, permeating almost any household or cultural topic with elements of jurisprudence.

The complex influence of these factors is an objective prerequisite for the assumption that, with an adequate and, at the same time, averaged methodology, it is possible to postulate reading authentic literature in the specialty and teaching oral speech on a series of professional topics, starting from the first year.

Method

Due to the limitation of studying a foreign language course at the Faculty of Law for only two years, the problem of maximizing the movement of starting to read texts in the specialty and learning oral communication on professional topics by the beginning of the first year becomes extremely important. At the same time, instead of contrasting general and special training, their interpenetration is an integral task. By virtue of the above, the prospects for a positive solution to the problems raised above have a solid foundation. Therefore, dependence on adequate methods of teaching foreign languages at law faculties becomes crucial.

The above factors favoring English language teaching in the junior courses of law faculties give grounds to formulate the research hypothesis as follows: when teaching a foreign language at law faculties, general linguistic and specifically professional language training from the first days of university studies should be carried out in a complex, which applies to all skills and abilities.

The content of the training should include reading authentic texts from the very beginning and using them as a means of teaching oral speech. In the field of oral speech skills devel-

opment, those that allow for professional saturation with elements of jurisprudence should be selected from the topics of oral speech.

Along with this, professional-oriented oral-speech texts should occupy an increasingly significant place for teaching students oral-speech communication in special legal scenarios. The element of jurisprudence in the totality of all English language teaching should be systemic in nature and should be chosen in such a way that it presents the basic legal sciences (criminal law, international law, civil law, etc.). There is reason to assume that the implementation of such training guarantees sufficient regional legal training.

When teaching English to law students, professional and general language training should be carried out in parallel (in a complex). From the very beginning, the content of the training should involve reading authentic texts, as well as using them as methods of teaching oral English. A special role in the study of English by law students as a way of their professional training is given to the assimilation of professional vocabulary. The study of the specifics of the vocabulary of the English professional language is carried out to develop oral skills and is aimed at implementing communication skills in future typical situations of professional communication, both written and oral. The information should be presented in such a way that the counterparty or the interlocutor is confident that they have mastered it correctly. It is necessary to cut down the skills of the ability to operate with basic models, which also has a number of special features in jurisprudence. For effective legal regulation, it is necessary that the form of expression and the content of the document strictly coincide, so that there is no ambiguity or ambiguity (Nurkhamitova R., Gerkina N., 2017, p. 99).

English at the business level is an integral and important part of the requirements for a professional lawyer and the successful advancement of students on the career ladder. This is due to the fact that business English currently covers all the most important areas of professional communication for future lawyers – international documentation and world science, ethics of behavior in typical situations, meetings, business correspondence, negotiation, communication by means of communication, etc. A business foreign language in the field of law implies a deeper study of professional aspects by students. That is, we can say that when studying it, it is necessary not only to master professional vocabulary in English, but also to be able to operate with general speaking skills on various topics. Therefore, the following areas of professional activity can be distinguished for the training of law students in English:

A) business communication by phone, videoconferences, that is, situations that require an immediate response to feedback from the interlocutor. The main task of linguistics is to achieve a correct understanding of you by the other side. It is necessary to develop the skills of using cliche phrases in order to introduce yourself, ask for a repeat, call back, etc.

B) role-playing situations that can be played out in a collective form and reflect certain aspects of legal practice. This is a synthetic form of communication, according to some authors, the most complex, which contains elements of improvisation.

C) business presentation as a way of monologue professional communication. This direction is characterized by the presence of a structure, the observance of which is mandatory for the speaker. At the same time, such important linguistic features are highlighted here, for example, the choice of verbal design of the content, the use of a set of stylistic tools, etc.

D) business letters. Writing skills are very relevant today in various forms of correspondence. This is due to the fact that business correspondence acts as a whole culture of communication, which has its own norms and rules, the knowledge of which is necessary for a professional lawyer who professionally studies a foreign language (Karapetyan M., 2018, p. 218).

The “blended learning” method, based on the widespread introduction of information technology, is one of the newest methods of teaching a foreign language to law students. The great advantage of this method in professionally oriented teaching of English to law students is the possibility of obtaining the necessary information within a few hours. It is also worth noting that network communication allows the learning environment to

provide unhindered access to information from both students and teachers, which fully corresponds to the continuity of the learning process. Many professionally oriented texts are taken in the modern educational process precisely from the Internet, which (Azizova S., 2016, p. 260).

Thus, it can be concluded that the changes that occur in all spheres of life lead to innovations in the education system. It is worth noting that today English is a global language of intercultural communication, including professional communication. Teaching English to law students as a way of their professional training is one of the priorities of the educational process at law faculties, this is due to the fact that proficiency in English can expand the opportunities of law students in finding employment and their subsequent career growth.

References

Azizova S. M. Features of professionally-oriented teaching of English to students majoring in law // Pedagogical Journal. 2016. – No. 4. – P. 251–260.

Bessarab T. P. Foreign language as a way of professional training of law students // Current issues of modern pedagogy: materials of the VII International scientific conference (Samara, August 2015). Samara: OOO "ASGARD Publishing House". 2015. – P. 136–138.

Karapetyan M. T. Teaching communication in English to students majoring in law // Young scientist. 2018. – No. 19 (205). – P. 215–218.

Nurkhamitov R. M., Gerkina N. V. Features of teaching English to law students at the university // Pedagogical sciences. 2017. – No. 58–1. – P. 97–99.

Tiersma P. M. Legal Language. Chicago, 1999. – 139 p.

submitted 14.10.2025;
accepted for publication 28.10.2025;
published 30.12.2025

Contact: science_7777@mail.ru

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

Section 2. General psychology

DOI:10.29013/EJEAP-25-4-28-32

STRESS LEVEL IN PARENTS WHO HAVE CHILDREN WITH AUTISM, DOWN SYNDROME AND TYPICAL DEVELOPMENT

Blerina Aliaj [1]***, Mirjeta Cenaj*** [1]

[1] Department of Education and Health. Sports University of Tirana, Faculty of Movement Sciences

Cite: *Blerina Aliaj, Mirjeta Cenaj. (2025). Stress Level in Parents Who Have Children With Autism, Down Syndrome and Typical Development. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-28-32

Abstract

The aim of this study is to compare the level of stress in parents of children with autism spectrum disorder and parents of children with Down syndrome, with a control group of parents of children with typical development. The instrument used in the study is two, (DASS), to measure stress. This study includes 30 pairs of parents for each group. The number of mothers taken in the study (n = 30) for each group, and the number of fathers of children with autism (n = 29), (n = 28) fathers of children with Down syndrome and (n = 28), fathers of children with typical development. Parents of children with Down syndrome resulted in higher levels of stress compared to parents of children with autism and parents of children with typical development.

Keywords: *autism, Down syndrome, stress, parents*

Introduction

Stress is an emotion that is associated with anxious thoughts, difficulty concentrating and paying attention, altered external behavior, clenching of teeth and hands, difficult breathing, empty stomach, dry mouth, increased heart rate, sleep disorders and many others. As a special psychological state, stress is associated with anything that makes demands to which we must adapt (Gray, 1987). Comparing parents of children with autism with parents of children with typical development and parents of children with other developmental problems, they have higher levels of stress, anxiety and depression, as well as lower levels of interaction in the family. They complain more about their health and consumption as a result of caring for their child. This is related to the difficulty in communication, behavior, social isolation, and self-care that these children have (Schieve, 2015). Parents of children with autism describe themselves as living in an isolated world (Woodgate, Ateah, Seço, 2016). As a result, both parents of children with autism are under stress and this can affect their physical and psychological health (Johnson, Frenn, Feetham, Simpson, 2011).

In a study conducted by a group of authors (Dumas, Wolf, Fisherman, Culligan, 2009), which aimed to measure differences in parenting-related stress, problem behavior, and malnutrition in 150 families with children with autism (n = 30), behavioral disorder (n = 30), Down syndrome (n = 30), and typical development (n = 60). Parents of children with autism and children with behavioral disorder reported higher levels of parenting stress than the other two groups. Mothers of children with autism reported higher levels of stress related to their child's problems than parents of children with typical development. Parents of children diagnosed with autism reported higher levels of stress, compared not only to parents of children with typical development, but also to parents of children with Down syndrome. The level of stress depends on several characteristics of the parents such as socioeconomic level or marital status. There are studies that show that single mothers who have children with developmental problems have higher levels of depression, other studies see depression as being more related to education level and income than marital status (Olsson, Hwang, 2008).

Compared with mothers of children with Down syndrome and mothers of typically developing children, mothers of children with autism report less competence in their role as parents, receive less satisfaction from their marriage, and exhibit less adjustment within the family than mothers of the other two groups. Both mothers of children with autism and those of children with Down syndrome report greater burden of caregiving, family burden, and self-blame than mothers of typically developing children (Rodrigues, Morgan, & Geffken, 1992).

What is the difference between mothers and fathers who have children with Down syndrome? According to (Hedov and Anneren and Wikblad, 2000) in 80% of cases it is mothers who take care of the children and not the fathers. As a result, mothers report lower self-esteem, higher levels of stress and less satisfaction related to everyday life than fathers. From the study of 25 families of children with autism and 30 families of children with Down syndrome, it was observed that the level of depression and social phobia is higher among parents of children with autism (Piven & Palmer, 1999).

Mothers of children with autism reported higher levels of stress than fathers. No differences were observed between mothers and fathers in parents of children with Down syndrome and parents of typically developing children (Dabrowska, Pisula, 2010).

Parents differ in how having a child with autism affects them in several aspects such as; in the assessment of risk and protective factors, in specific coping styles and in the experience of stress. Both parents feel high levels of stress related to the child's problematic behaviors, but the mother seems to be more affected than the father by the child's emotional dysfunction and low social skills (McStay, Trembath, Dissanayake, 2014).

Materials and Methods

This is a quantitative study. Both parents were included in the study. The number of parents with children with autism and the number of parents with children with Down syndrome is the same, i.e. 30. As for parents with children with developmental problems, the number of parents with children with typical development included in the study is 30. This is the control group. The aim was to include 30 pairs of parents from each group in the study, but as a result of the participation of single, divorced and widowed mothers in the study, the number of mothers is higher than that of fathers. One mother with a child with autism is a single mother. One mother with a child with Down syndrome is widowed and one is divorced. One mother with a child with typical development is widowed and one is divorced. For the realization of this study, the following was used: DASS, a questionnaire that aims to measure stress. The scale was developed in 1995 by Lovibond S.H and Lovibond P.C, from the Psychology Foundation in Sydney. The completion of this instrument is carried out through self-reporting. Each person involved in the study reads all the written statements and circles a number corresponding to a scale of the questionnaire from 0 to 3, where each number takes on a certain value. Number 0, indicates that the statement does not apply to me at all, number 1, applies to me in some cases or sometimes, number 2, applies to me

in a significant number of cases or most of the time and number 3, applies to me most of the time. The questionnaire contains a total of 42 questions and aims to measure the emotional state of the individuals who complete it in the last week. The scoring after completing the scale is done taking into account the following units of measurement: normal stress, light, moderate, severe, very severe.

Findings and Discussion

The following table presents the stress level of mothers with children with autism, Down syndrome and typical development. Descriptive statistics will help us to identify the results and answer the questions that arise from the confirmation or rejection of the hypothesis. The analysis used is ANOVA (Brown., Forsythe 1974) using the SPSS program.

Table 1. *Analysis of stress levels in mothers and fathers*

		N	Average	Standard deviation	Standard error	Limit min	Limit Max	Minimum	Maximum	Variance between variables
Stress in Women	Model	Fixed Effects		8.10584	0.85443	8.5795	11.9761			
		Random Effects			2.50306	-0.492	21.0476			16.60577
	Autism	30	16.9667	9.55378	1.74427	13.3992	20.5341	0.00	37.00	
	Down Syndrome	30	23.1667	10.06901	1.83834	19.4068	26.9265	0.00	35.00	
	Typical development	30	10.8000	7.01427	1.28062	8.1808	13.4192	1.00	27.00	
	Total	90	16.9778	10.22662	1.07798	14.8359	19.1197	0.00	37.00	
	Model	Fixed Effects		8.97886	0.94645	15.0966	18.859			
		Random Effects			3.56995	1.6175	32.338			35.54637
Stress in Men	Model	Fixed Effects		6.45872	0.70055	5.324	8.1113			
		Random Effects			1.14955	1.7715	11.6637			2.49139
	Autism	29	12.2069	7.83025	1.45404	9.2284	15.1854	0	34	
	Down Syndrome	28	19.5357	8.23939	1.5571	16.3408	22.7306	2	34	
	Typical development	28	9.5714	7.25426	1.37093	6.7585	12.3843	0	25	
	Total	85	13.7529	8.77348	0.95162	11.8605	15.6453	0	34	
	Model	Fixed Effects		7.78568	0.84448	12.073	15.4329			
		Random Effects			2.96628	0.9901	26.5158			24.25038

Mothers of children with Down syndrome in Albania have significantly higher stress levels compared to mothers with children with autism. The stress level of women with autistic children is almost 17, considered mild with fluctuations ranging from 13.4 (normal stress level) to 20.5 (moderate stress level) in 95% of cases. In mothers of children with Down syndrome children, the stress level is 23.2, in other words 6 points

more than mothers with autistic children. The fluctuation ranges from 19.4 (moderate stress) to 26.9, where the stress level is severe. For the Albanian mothers surveyed, the stress level is higher among those with Down syndrome children compared to women with autistic children, while women with children with typical development are at normal levels. Unlike women, men systematically have lower stress level indicators.

In explaining stress levels, we return to normality and predictability when we see that men with autistic children have a higher level of stress indicators compared to men who have children with typical development. The stress level of men with autistic children remains below the normal limit, while this limit is exceeded by fathers of children with Down syndrome, who have a moderate stress level and approach the limits of severe stress in the most extreme cases. Like women, men also have lower levels of depression, anxiety and stress when raising autistic children compared to when they are parents of Down syndrome children. Referring to the data in the table above, men have lower levels of depression, anxiety and stress compared to women, perhaps because men spend less time raising children compared to women and a larger proportion of them work and are able to temporarily relieve stress, depression and anxiety about the condition of their children.

Table 2. *Homogeneity of Variances Test*

	Levene Statistic	df1	df2	Sig.
Stress in women	3.024	2	87	.054
Stress in man	.167	2	82	.846

From the table above we can distinguish the results of the test of homogeneity of variance (test of homogeneity of variance) that provides the Levene test, (Levene, 1960) to check the assumption whether the variance within each group is similar or not. In our case the Levene test is not significant at the $\alpha=0.05$ level and the results $F(2,82)$, $p=0.846$ for stress for men, $F(2,82)$. Regarding the results of women, we have $p=0.054$ for stress in women, which means that in this analysis the hypothesis of homogeneity of variance is confirmed or in other words it is not violated for this sample.

Conclusion

In this study, it was found that the level of stress is higher in mothers of children with Down syndrome and lower in mothers of children with typical development. Even in terms of fathers, the results show that the level of stress is lower in fathers of children with typical development and higher in fathers of children with Down syndrome. Getting the right social support for themselves and their children is very important for family members to adapt to the difficulty they are in. Social support can also reduce the impact of stress and depression in mothers of children with autism, meaning that social support plays an important role in protecting the mental health of parents of children with developmental problems (Silkos, Kerns, 2006). Cooperation between the family and the school will result in a good intervention for the child. Parents of children with disabilities are not only involved in direct intervention with the child but are also valuable members of their child's special education team. They are active participants in the evaluation and design of their children's school programs. This approach encourages coordination between children, their families, special education institutions, and the school (Gupta, Singhal, 2005).

References

Brown, Morton B.; Forsythe, Alan B. (1974) "Robust tests for equality of variances". *Journal of the American Statistical Association*. – 69: 364–367.

Dumas, J., Wolf, L., Fisherman, S., Culligan, A. (2009). Parenting stress, child behavior problems, and dysphoria in parents of children with autism, down syndrome, behavior disorders, and normal development. Taylor and Francis online, – 97 p.

Gray. J (1987). The psychology of fear and stress. Cambridge university press 1987. – P. 70–75.
Hedov, G., Wikbald, K., Anneren, G. (2002). First information and support provided to parents of children with Down syndrome in Sweden: clinical goals and parental experiences. TOC, – 1344 p.
Johnson, N., Frenn, M., Feetham, S., Simpson, P. (2011). Autism spectrum disorder: Parenting stress, family functioning and health-related quality of life. Families, Systems, & Health, – Vol 29(3). – 232 p.
McStay, R & Trembath.D & Dissanayake, Ch. (2014). Stress and Family QOF in Parents of Children with Autism Spectrium Disorder: Parent Gender and the Duble ABCX Model. Springer, – P. 1–12.
Olsson, M., Hwong, C. (2008). Depression in mothers and fathers of children with intellectual disability. Journal of intelectual disability research – Vol. 45. – P. 535–356.
Piven, J., Palmer, P. (1999). Psychiatric disorder and the broad autism phenotype: Evidence from a family study of multiple-incidence autism families. American Psychiatric Association Publishing, – P. 557–563.
Rodrigues, J., Morgan, S., Geffken, G. (1992). Psychosocial adaptation of fathers of children with autism, down syndrome, and normal development. Journal of Autism and Developmental Disorders, – 249 p.
Schieve, L. (2015). The Relationship Between Autism and Parenting Stress. National Center on Birth Defects and Developmental Disabilities, – P. 114–115.
Woodgate, R., Ateah, Ch., Secco, L. (2016). Living in a World of Our Own: The Experience of Parents Who Have a Child With Autism. Sage, – 48 p.

submitted 12.10.2025;
accepted for publication 28.10.2025;
published 30.12.2025

Contact: baliaj@ust.edu.al

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

DOI:10.29013/EJEAP-25-4-33-36

IN INTERPERSONAL AND INTERCULTURAL COMMUNICATION THE ROLE OF EMOTIONAL INTELLIGENCE

Imdad Mustafa Bayramov [1]

[1] Department of Psychology, Baku State University

Cite: *Bayramov I.M. (2025). In interpersonal and intercultural communication the role of emotional intelligence. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-33-36

Abstract

This scientific article explores the intricate relationship between emotional intelligence (EI) and the social-cultural behavior of individuals. Emotional intelligence, defined as the ability to perceive, understand, manage, and regulate emotions in oneself and others, plays a crucial role in shaping how individuals navigate and interact within diverse social and cultural contexts. Through an extensive review of current literature and empirical studies, this article aims to shed light on the impact of emotional intelligence on various aspects of social-cultural behavior, including interpersonal relationships, communication, and adaptability.

Keywords: *emotional intelligence, socio-cultural behaviors, personal well-being, professional success, social interaction of individuals*

Login

Emotional intelligence has gained considerable attention in recent years for its role in influencing various aspects of human behavior. While its impact on personal well-being and professional success has been widely studied, its relationship to sociocultural behavior is a growing area of research. Sociocultural behavior encompasses the actions, attitudes, and reactions that individuals exhibit in diverse social and cultural environments.

In an era marked by global interconnectedness, the ability to communicate effectively in a variety of interpersonal and cross-cultural contexts is of paramount importance. As communication transcends geographical boundaries and cultural barriers, the role of emotional intelligence emerges as a critical factor shaping the quality and success of these interactions. Defined as the ability to recognize, understand, manage, and utilize one's own and others' emotions, emotional intelligence plays a crucial role in navigating the complexities of interpersonal and cross-cultural communication.

In an increasingly interconnected global society, effective interpersonal communication is the foundation of personal relationships, professional collaborations, and public interactions. The expression and interpretation of emotions in these interactions significantly influences the outcomes of conversations, relationships, and the overall social structure (Riess, 75).

Emotional intelligence is a multifaceted set of skills that include self-awareness,

self-regulation, empathy, and social skills. Together, these elements contribute to an individual's ability to manage the subtleties of human emotions, both their own and those of others. Thus, emotional intelligence is a key determinant of the success of interpersonal communication, influencing the way individuals convey and interpret emotional signals.

Interpersonal communication is inherently emotional, involving expressions of joy, sadness, anger, and countless other feelings. People with high emotional intelligence are able to manage and respond to these emotions skillfully, creating more meaningful relationships. This skill is especially important in diverse and multicultural settings, where understanding and respecting a variety of emotional expressions is essential.

Intercultural communication presents an additional layer of complexity, as individuals from different cultural backgrounds bring unique communication styles, norms, and expectations. Misinterpretations of emotional cues, cultural misunderstandings, and clashes in communication styles are common problems that can be alleviated through the lens of emotional intelligence.

Emotional intelligence becomes a cornerstone of effective cross-cultural communication. The ability to recognize and adapt to a variety of emotional expressions, combined with cultural empathy, allows individuals to bridge gaps, build trust, and manage potential conflicts. In cross-cultural settings, emotional intelligence serves as a guide to interpreting nonverbal cues and promoting more inclusive and harmonious exchange of ideas (Melvin, 243).

As the world becomes a global village, collaboration across borders is becoming increasingly important. Global initiatives, business partnerships, and academic collaborations require individuals with high emotional intelligence who can manage cultural diversity, build relationships, and foster shared understanding across language and cultural differences.

1. Emotional intelligence and interpersonal relationships

One of the main areas where emotional intelligence has an impact is interpersonal relationships. People with high emotional intelligence are better equipped to recognize and interpret the emotions of others, which leads to the development of empathy and understanding. This heightened sensitivity promotes positive social interactions and effective communication, helping to develop meaningful relationships. Conversely, individuals with lower emotional intelligence may struggle to navigate the complexities of social relationships, potentially leading to misunderstandings and conflict.

In the realm of interpersonal relationships, the ability to accurately recognize emotions in oneself and others is the foundation for effective communication and understanding. Emotional intelligence involves heightened sensitivity to facial expressions, body language, and verbal cues, which facilitates a deeper understanding of emotional states in the context of communication (Mayer, 211).

Understanding the complex structure of emotions, including their origins and significance, is a critical aspect of emotional intelligence in interpersonal relationships. People with well-developed emotional intelligence can empathize with the emotional experiences of others, fostering deeper connections and mutual understanding.

Effective emotional regulation is essential for maintaining harmony in interpersonal relationships. Emotional intelligence enables individuals to manage their emotional responses appropriately, preventing the escalation of conflict and contributing to a more conducive relationship environment. The ability to regulate emotions also facilitates adaptation and resilience in the face of relationship challenges (Harrison, 76).

The strategic use of emotions to enhance communication and problem-solving is another dimension of emotional intelligence in interpersonal relationships. Individuals with high emotional intelligence use their emotional awareness to manage social situations, express empathy, and foster positive interactions, thereby contributing to the overall quality of relationships.

Effective communication is the cornerstone of healthy relationships, and emotional intelligence plays a crucial role in this. The ability to accurately interpret and convey emotions increases the clarity and depth of communication, strengthening the sense of connection and mutual understanding. Emo-

tional intelligence also facilitates the adaptation of communication styles to the emotional needs and cultural conditions of different relationship contexts (Goleman, 44).

Interpersonal relationships inevitably involve conflict, and emotional intelligence plays a crucial role in managing and resolving these disputes. The ability to understand and regulate emotions during disagreements promotes constructive dialogue, prevents conflict from escalating, and helps develop strong and mutually agreeable relationships.

Empathy, a core component of emotional intelligence, is a powerful catalyst for building meaningful connections in interpersonal relationships. This empathetic ability increases the depth and authenticity of relationships, contributing to a more positive and supportive social environment.

Defining emotional intelligence in the context of interpersonal relationships provides valuable insights into its multifaceted role in shaping the dynamics of human relationships. As we explore the intricacies of social interaction, understanding and developing emotional intelligence emerges as essential components for developing healthy, fulfilling, and culturally sensitive relationships (Ekman, 255).

Empathy encompasses not only the ability to recognize and understand the emotions of others, but also the ability to resonate with those emotions in a way that transcends cultural differences. In cross-cultural relationships, empathy becomes a bridge that unites individuals from diverse backgrounds, fostering a sense of shared understanding and common humanity.

Cultural differences are often reflected in communication styles, social norms, and value systems. Empathy allows individuals to manage these differences by appreciating different perspectives. By understanding the emotional context of cultural behaviors, individuals with high emotional intelligence can build relationships that transcend communication barriers and are based on mutual respect and understanding (Yoo, 358).

Empathy contributes to cultural sensitivity by allowing individuals to appreciate the emotional elements inherent in different cultural expressions. This heightened awareness allows individuals to approach cross-cultural interactions with humility, openness, and understanding of the emotional experiences of others. Thus, developing empathy becomes a way to foster positive cross-cultural relationships.

Empathy serves as a powerful tool for challenging and mitigating stereotypes and prejudices that can arise in cross-cultural interactions. People with strong empathic abilities are able to transcend preconceived notions by understanding the unique emotions and experiences of others. This, in turn, promotes more authentic and equitable relationships, free from the constraints of cultural stereotypes.

Trust is the foundation of any successful relationship, and empathy plays a crucial role in building trust across cultural boundaries. Emotionally intelligent individuals can build relationships by understanding and showing respect for the emotions of people from different cultural backgrounds, creating a solid foundation for positive and lasting cross-cultural connections.

Effective communication plays a key role in building and maintaining interpersonal relationships. Emotional intelligence contributes to communication skills by enabling individuals to adapt their communication styles to different cultural norms. People with high emotional intelligence are adept at deciphering nonverbal cues and promoting open dialogue, thereby facilitating smoother interpersonal interactions across cultural boundaries (Elias, 55).

People with high emotional intelligence demonstrate greater adaptability in their communication style, adapting their expressions to the emotional needs and cultural norms of their interaction partners. This adaptability promotes a more fluid and harmonious communication process, reduces the likelihood of misunderstandings, and promotes a deeper level of connection in interpersonal relationships.

Nonverbal communication, including body language, facial expressions, and gestures, plays an important role in interpersonal relationships. Emotional intelligence allows individuals to accurately decode and interpret these nonverbal cues. This heightened awareness helps to understand the emotions of others more subtly, improving the overall quality of communication in different cultural contexts (Melvin, 243).

References

Elias, M., Arnold, A. The educator's guide to emotional intelligence and academic achievement. Social-emotional learning in the classroom. Thousand Oaks, CA: Corwin Press 2006.
Ekman, P. Universal and cultural differences in facial expression of emotion. JR Cole (Ed.). Nebraska Symposium of Motivation 1971. (P. 207–283). Lincoln, NE: University of Nebraska Press, 1972.
Goleman, D. Emotional Intelligence: Why It Can Matter More Than IQ. New York: Bantam Books 1995.
Harrison, J.K., Voelker, E. Two personality variables and the cross-cultural adjustment of study abroad students. Frontiers: The Interdisciplinary Journal of Study Abroad 2006. – 17. – P. 69–87.
Melvin, C., Ephraim A., & Sussie U. Emotional intelligence and cross-cultural communication competence: An analysis of group dynamics and interpersonal relationships Q.

submitted 14.11.2025;
accepted for publication 28.11.2025;
published 30.12.2025

Contact: imdad_bayramov@list.ru

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

DOI:10.29013/EJEAP-25-4-37-40

PHILOSOPHICAL ANALYSIS OF THE ECOLOGICAL OUTLOOK

Mikayilov Shasaddin Sabir [1]

[1] Azerbaijan State Pedagogical University, Shamakhi Branch, Azerbaijan

Cite: *Mikayilov Sh.S. (2025). Philosophical Analysis of the Ecological Outlook. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-37-40

Abstract

The ecological outlook of contemporary society reflects a complex interplay between scientific understanding, cultural attitudes, and philosophical worldviews. As environmental crises intensify – ranging from climate change and biodiversity loss to the erosion of ecological integrity – there is growing recognition that technical solutions alone are insufficient. This paper offers a philosophical analysis of the ecological outlook, examining how underlying assumptions about nature, value, and human agency shape environmental thought and practice. Drawing on traditions such as environmental ethics, phenomenology, deep ecology, and eco-centrism, the study evaluates competing conceptions of the human–nature relationship, including anthropocentric, biocentric, and holistic frameworks. It argues that many ecological problems stem from deeply embedded metaphysical and moral assumptions that regard nature as an external resource rather than a relational and co-constitutive field of existence. Through critical evaluation of dominant paradigms – such as technological optimism, economic growth models, and utilitarian cost-benefit approaches – the analysis reveals their limitations in addressing ecological degradation. The paper concludes by advocating for a transformative ecological outlook grounded in reciprocal responsibility, intrinsic valuation of nonhuman life, and an expanded moral community that encompasses ecosystems and future generations. Such a philosophical reorientation is essential for fostering sustainable practices, cultivating ecological consciousness, and reshaping the ethical foundations that guide human interaction with the natural world.

Methods: This study employs philosophical analysis as its central methodological approach, integrating several complementary strategies within a single analytical framework. First, conceptual analysis is used to define and clarify core terms such as “ecological outlook,” “anthropocentrism,” and “ecocentrism,” ensuring precision in the theoretical discussions. Second, critical evaluation is applied to major philosophical positions within environmental ethics, allowing for the identification of underlying assumptions, strengths, and limitations in prevailing ecological worldviews. Finally, normative reasoning is used to construct and justify a more relational and ethically grounded ecological outlook. Combined, these methods enable a rigorous and coherent examination of environmental philosophy aimed at revealing how metaphysical, ethical, and cultural assumptions shape ecological understanding and practice.

Keywords: *ecological worldview, cognition, man and nature, humanism, harmony, spiritual activity, society*

Introduction

It is a well-known fact that no problem can be solved without solving the problem of man and nature. The emergence of the threat of ecological crisis creates the need for society to take an optimal position towards nature. Here, the solution of the humanistic attitude to nature as a problem is possible from the point of view of the spiritual worldview. Every person has a moral duty. Because nature belongs to humanity, it is common and unified.

Old norms of behavior are replaced by new progressive attitudes, norms and principles. That is, human cognition develops from little knowledge to full knowledge. In the formation of all these norms, public relations are given a large place. As the social attitude is formed, a heightened awareness is established. Finally, a person realizes his duty, a moral need arises, and a conscious response to public duty is accompanied by a moral feeling. With this, a number of humane relationships such as truthfulness, correctness, and kindness are formed.

In the modern era, each of us should understand the meaning of relations in society and nature depending on the essence and purpose of the era. Because the changes occurring in nature affect the consciousness, psychology and interests of each of us. Therefore, the time we live in makes a humanistic demand: every person should think about what nature will give to people today and tomorrow. The Greek philosopher Democritus, based on understanding the thought of nature, gives a reason to confirm our opinion that positive qualities should be viewed as humane qualities and that he called kindness and fairness the controller of human behavior for the first time. Therefore, the ecological basis of the humanistic attitude requires an ethical-moral approach to the issue.

Case of study

On our troubled planet, the problems that arise in relation to human life and the relationship of man to nature are on the field of real research. In the modern era, the regulation of the relationship between man and nature has a universal content. In general, the problem of man and his attitude to nature has historically been inextricably linked with solving the main problem of philosophy. There has been a sharp clash of ideas around this problem for centuries. Currently, this struggle has intensified. Now it is impossible to solve any other problem without solving the problem of man and nature. This problem was able to gather representatives of almost all fields of science. Not only representatives of this field, but also ecologists, geographers, cyberneticians, economists, physicians, sociologists, psychologists, geneticists, lawyers, mathematicians, etc. representatives of other fields of science try to study the problem of interaction between nature and society.

Literature review

Now there is a lack of drinking water and clean air on the earth, the extinction of animal and plant life is obvious. They uncontrollably extract minerals from the earth's surface. Humanity has become a decisive factor in the change and development of the biosphere. A number of ecological schools emerging in the West put forward their methodological concepts that differ from each other (physical knowledge complex A. Wesley, C. Monteith, economic ecological synthesis T. Daly, K. Boulding, A. Nis, etc.). Up to now, in important state documents, the preservation and increase of natural resources, their effective use, and the formation of a high sense of responsibility have been put forward as the main issues. Regardless of the existence of various concepts and legislation, the development of nature and society progresses. Now the modern man should have his say about this development. The relationship between the humanistic structure of society and the humanistic attitude of man towards nature was also noted by sociologists. Researchers considered the harmonization of the relationship between society and nature as one of the most important conditions for the development of society. The new society should act as a supporter of preserving all the assets of the previous development. Such a society is not finished naturalism, but finished humanism-naturalism.

The role of nature in social life is not only the source of material and vital benefits. All types and forms of human activity are connected with nature, and in this sense its role is universal. Nature determines a person's health, mood, and ability to work. It is a source of beauty and joy, an object of constant search and discovery of truth. It is a universal irreplaceable means of satisfying both material and spiritual needs of a person (Shukurov, 1994).

Humanistic attitude to nature has been formed historically. In general, aspects such as humanism, kindness, helping the weak, and large-heartedness were not formed in a day. For thousands of years, peoples and nations have struggled for the formation of those qualities, collectives, groups, and individuals have tried to turn a humane attitude towards nature into a habit. If public interests manifest themselves in a predatory, distorted form, even the most ideal personality will join the process of destroying nature (Mikayilov, Hagverdiyev, 2018).

Almost all thinkers of antiquity saw in benevolence and humanism such a source that the most diverse ideas were included in its content and it was even terminologically expressed in the most diverse ways. All the thinkers of that time agreed with this idea: "To listen to the voice of truth and not to think about violence, – the priest advises his brother like this:...".

According to Plato, moral activity and ideal are not conditioned by anything, and have the character of a general law, which is necessary in cognition, human behavior and, in general, in any field of existence. Thus, the thoughtfulness and intelligence of people reveal the functioning of humanistic relations. In right thinking, there is an awareness of authenticity, inner freedom, justice, kindness, etc. Such qualities create spiritual wealth in people. Even Socrates was a supporter of such a position: "...self-awareness gives people many moral qualities, and wrong about oneself brings many misfortunes. Whoever understands himself, he knows what is useful for him, and we clearly understand what he can do and what he can't do." (Xenophon, 1935)As in ancient times, the idea of the formation of intelligence and thinking remains relevant in modern philosophy (Feuerbach, 2000). The thinkers of the 17th and 18th centuries developed this idea in accordance with historical conditions and came to such conclusions that they have not lost their importance even today: First, do not have a natural influence on a real individual in order to awaken humane feelings and actions, moral imaginations based on the initial conditions of intelligence and the intelligence of human nature. it is possible to fight for secular education by putting forward the idea of possibility. Secondly, the human problem is addressed in the new age philosophy. Man becomes an object of spiritual activity. The way of humanizing the social consciousness leading to the equality and inner freedom of people is understood. Thirdly, the concept of strengthening human power over nature is felt, as the possibility of implementing the "educational strategy" in the path of humanization is viewed with considerable doubt (Hesiod, 1963). True, the main demand in this period was the acquisition of theoretical knowledge. Therefore, he sees the study of nature in the direction of its separation from man. The inefficient, unmeasurable impact on nature threatened the development of the living world. Regarding such a problem, we can recall the ideas of A.Pechchei. The meaning of the problem facing humanity is that people cannot adapt their culture to the changes they have brought to this world (Pechchei, 1980).

The source of the crisis is not "outside" but "inside" the person, and the solution of all these issues depends on the person changing himself and his inner essence.

A. Lenkova, a prominent Polish scientist in the field of nature protection, named her book as follows: "The skinned place". People did it because of ignorance and inexperience. They cut down the forests in large areas and spoiled the soil cover. Nature is also indebted to those people. A number of advanced countries in the Middle East and the Black Sea coast soon collapsed. The disappearance of the first culture that existed on the territory of Mexico is also explained by that reason. (Porritt, 1986).

The ecological basis of the humanistic attitude to nature is first of all: a) the planning of the socio-economic ecological policy line in the creation of a harmonious development

program of nature and society, b) concretely, the scientific and technical solutions to environmental problems: v) the formation of the ecological outlook of the personality.

In short, according to the words of T. Lebsak, the interaction of ecological policy, ecological economy and ecological outlook constitutes civilization (Lebsak, 1983). Undoubtedly, the attitude of us people towards nature comes first of all from its demand. Demand is a manifestation of a person's normal state, his active reaction to the influence of the external environment. However, understanding it can have a strong impact on personality development. Studies show that the higher the spiritual level of a person, the higher his demand. In this sense, spiritual progress and increasing demand are a necessary condition for each other.

Conclusion

Our century is a completely new century from the point of view of attitude towards nature. Human power has already reached a level comparable to many natural-geological processes. Man is no longer afraid of natural forces, he uses them, creates new substances that do not even exist in nature itself. Recently, there has been a lot of talk about the selection of optimal options in the human-nature relationship and the optimization of the biosphere in general.

References

Mikayilov, Sh. S., & Hagverdiyev, T. Sh. (2018). *Directions of cognitive acquisition*. – Baku.
Feuerbach, L. (2000). *Selected works* – Vol. 1. – 203 p.
Xenophon. (1935). *Socratic essays* (P. 147). Academy. (Original work by Xenophon of Athens).
Porritt, J. (1986). *Greens movement* (P. 43, 48). Oxford.
Hesiod. (1963). *Works and days*. In *Hellenic poets* (P. 778). GIKhP.
Pechchei, A. (1980). *Human qualities* (P. 14).
Shukurov, A. (1994). *Environmental education is one of the necessary conditions of social environmental policy*. In *Ecology. Philosophy. Culture.* (P. 5). – Baku.
Lebsak, T. (1983). *The last years of humanity* (P. 241). Munich.

submitted 28.11.2025;
accepted for publication 12.12.2025;
published 30.12.2025

Contact: mikayilov.elmiishler@mail.ru

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

Section 3. History of education of pedagogy

DOI:10.29013/EJEAP-25-4-41-49

MODAL TRANSFORMATION AND VALUE OUTLOOK OF ONLINE LEARNING IN THE CONTEXT OF METAVERSE

Shan Wang [1]***, Jiali Yao*** [2]

[1] Faculty of Education, Southwest University, China

[2] Center for Studies of Education and Psychology of Ethnic Minorities in Southwest China, Faculty of Education, Southwest University, China

Cite: *Shan Wang, Jiali Yao. (2025). Modal Transformation and Value Outlook of Online Learning in the Context of Metaverse. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-41-49

Abstract

The advent of the Metaverse has transformed the media ecology of online learning, freeing learners from flattened, replicative, and disciplined learning spaces into a high-fidelity simulated virtual reality world characterized by creative freedom. This paradigm shift has redefined traditional human modes of physical operation, communication, and collaboration, while reshaping the inherent modalities of online learning. From the perspective of perception, the Metaverse transcends screen-mediated visual and auditory engagement, enabling integrated five-sense connectivity. In terms of knowledge construction, it liberates individuals from inherent real-world constraints, facilitating the reconstruction of knowledge and fostering exploration of innovative possibilities. With regard to thinking patterns, the fusion of fantasy and reality in virtual environments dismantles the materialistic lens of physical thinking, replacing it with highly personalized virtual thinking that offers cognitive interpretations distinct from real-world dimensions through heterogeneous time-space perspectives. The authenticity of perceptual experiences, breakthroughs in self-cognition, and imaginative learning engagement afforded by the Metaverse demonstrate that Metaverse-based learning possesses innovative and universal educational advantages compared to traditional online learning models.

Keywords:*online learning, Metaverse-based learning, media ecology, modal transformation, value outlook*

Since major global tech giants entered the Metaverse sector in 2021, the concept has gained worldwide prominence. Academic circles tend to define it as a digital medium, intelligent technology, or form of human social development, characterized by polysemy, complexity, and inclusivity. The Metaverse's core idea of creating a "new reality" also

offers possibilities for the comprehensive and in-depth transformation of online learning. Unlike traditional internet-based learning models, the Metaverse – a virtual reality concept that integrates "blockchain, 5G, artificial intelligence, 3D, VR/AR/XR, brain-computer interfaces, and other cutting-edge technologies of humanity" (Zhao, G. D., Yi, H. H., & Xu, Y. Z., 2021)—utilizes simulation technology to construct a "digital twin" space parallel to the physical world. With the support of various sensory experience devices, learners can engage in highly realistic interactions between humans and between humans and virtual objects (Liu, G. P., Wang, X., Gao, N., et al., 2021).This means that while the Metaverse transforms traditional modes of physical operation, communication, and collaboration, it also leads the revolution of the learning ecology, shaping an entirely new learning model distinct from traditional approaches. Therefore, researchers must adopt a more developmental perspective to assess the value of the Metaverse in empowering online learning.

I. The Metaverse Drives the Innovation of the Media Ecology in Online Learning

1.1 Scenario Innovation: High-Fidelity Simulation of Learning Environments

As a concept originating from science fiction, the Metaverse's most anticipated feature is its ability to achieve dynamic high-fidelity simulation of humans and objects. This simulation utilizes 3D display technologies (e.g., ray tracing, real-time rendering, facial capture) and virtual devices such as VR, AR, MR, and XR to create virtual scenarios more realistic than reality itself, thereby providing learners with authentic experiences characterized by greater activity, inquiry, interactivity, and immersion (Hua, Z. X., & Fu, D. M., 2022). As a tool for technology and thinking, the Metaverse not only offers crucial support for online distance education but also poses challenges to understanding its characteristics and utilizing it appropriately. Teaching interaction lies at the core of online learning; understanding the Metaverse's essential impact on and supportive role in the interaction process is critical to the implementation and effectiveness of online learning. Unlike traditional two-dimensional online environments, the Metaverse constructs high-fidelity simulations through digital technology and interactive support, focusing on creating a form of "mediated reality" for learners – one that encompasses three dimensions: perceptual reality, physical reality, and virtual reality.

1.1.1 Perceptual Reality: Immersive Embodiment Through Multi-Sensory Integration

Perceptual reality stems from the Metaverse's ability to replicate real-world scenarios using emerging media technologies such as artificial intelligence, blockchain, virtual reality, and augmented reality. It constructs the three-dimensionality and authenticity of objective material existence in virtual space, transforming the fragmented state of individual perception – caused by the overextension of single senses through media terminals – into a truly immersive, embodied state where interactivity and imagination coexist. Once learners enter the Metaverse, their physical perception is fully present, enabling them to receive real-time sensory feedback from all five senses anytime, anywhere. This is the somatic reality enabled by the real-time synchronization of information between the virtual and physical worlds.

1.1.2 Physical Reality: Precision Replication of Real-World Details

Physical reality serves as the foundation for the Metaverse's construction of authenticity. The Metaverse can fully reproduce and accurately replicate all details of real-world scenarios – such as real-time images of school campuses under different climatic conditions and vivid, dynamic details of natural landscapes. In this new media-based online learning model, learners can create or select required learning scenarios in the Metaverse at any time without physical movement, experiencing the visible, tangible, and perceptible high-fidelity simulation of the learning environment.

1.1.3 Virtual Reality: Constructing an "Authentic" Order Through Human Modeling

Virtual reality is the purpose of the Metaverse"s production of its own "authentic" order. Modern cognitive science posits

that humans are "model-building creatures" who, through information processing, can construct models of events that have not occurred or been perceived (Yu, G.M., 2021). Drawing on existing experiences, humans actively create virtual real worlds that transcend reality and psychologically "complete" virtual reality through their established cognitive structures. In other words, virtual reality produces "authenticity" through human thinking or sensory modeling. From Jean Baudrillard's perspective, this form of authenticity replaces reality with coded simulations, further undermining the ontological status of "objective reality"—rendering the question of whether "authenticity" exists in the traditional sense irrelevant.

1.2 Production Innovation: Decentralization of Content Creation

In a decentralized institutional framework, the way individuals establish information channels is through a "P2P-based peer-to-peer communication network that bypasses platform and government control, thereby granting each individual a cyber space coordinate with high interconnections between coordinates" (Zhao, H.X., & Zhang, Z., 2018). Every learner retains the right to participate in collaboration, and the value of the final content is not determined by online platforms or administrators. This decentralized nature transforms individuals into active producers and creators, endowing the Metaverse with communist tendencies in the realms of productive forces, production relations, and superstructure. As the core values of the Metaverse, "co-creation, sharing, and co-governance" will be integrated into the digital collaborative production and daily life of groups, enabling everyone to freely contribute their abilities and enjoy the joy of creation as if playing a game.

While Web 2.0 has achieved significant breakthroughs in co-creation and sharing – for instance, content platforms such as WeChat Official Accounts, Douyin, and Bilibili provide creators with corresponding remuneration based on content quality, view counts, and likes – homogeneous content creation has increasingly drifted toward bandwagoning, plagiarism, and vulgarization driven by traffic, click-through rates, and capital interests. This has resulted in insufficient momentum and delayed progress in knowledge innovation. Current Web 2.0 has enhanced the convenience of knowledge access for learners, and the Internet in the Web 3.0 era will rely increasingly on the production of innovative knowledge. Ikujiro Nonaka, Hirotaka Takeuchi, and others argue that "organizations cannot create knowledge; only individuals can" (Zhang, J.Y., 2021).

Built on Web 3.0 technology, the Metaverse places greater emphasis on protecting innovative intellectual property. In its early stage, it primarily stimulates the independent piecing together of node knowledge, with the long-term goal of fostering the autonomous integration of such knowledge to achieve connection and consolidation. Unstructured knowledge collisions among learners in the Metaverse often spark creativity, while the decentralized organizational function links these knowledge fragments: one viewpoint may refine another, and one idea may serve as the answer to another question. This means that decentralized organizational effects not only integrate knowledge but also maximize the liberation of learners'intellectual vitality, making it more likely to generate cutting-edge innovative technologies and knowledge.

1.3 Documentation Innovation: Instantaneous Mediatization of Life Experiences

Kim Sang-yun argues that the life log constitutes a form of the Metaverse. A "life log refers to the act of recording, preserving, and sometimes sharing various experiences and information related to daily life" (Kim, S.Y., 2022). Common social media platforms such as Weibo, Xiaohongshu, Douyin, and Kuaishou represent the elementary manifestation of the social Metaverse. Every individual can document their observations, thoughts, feelings, and life experiences on these platforms, enabling the exchange of experiential information in interactions between individuals, individuals and communities, communities and communities, and individuals and society – thereby fostering broader and deeper life connections. This serves as a means of documenting personal growth.

William James, the "father of American psychology," defined the self as "the sum total

of all that he can call his own. This includes not only his body and his mental capacities, but also his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and horses, his yacht and bank account. All these things give him the same emotions" (Wiley, A. P., 2011). However, these emotional self-representations are ephemeral in real-world experiences. In contrast, the advanced form of the Metaverse transcends the spatial barriers between the real and virtual worlds and the temporal constraints imposed by technology, clearly storing emotions, attitudes, and imaginations from instantaneous experiences in the image repository of the digital brain. When individuals attempt to "explain the past self to the future self from the perspective of the present self," they no longer retrieve fragmented and incomplete "selves" from fragments of real ontological memory, but encounter the original "self" in the image repository – a self that serves as an observational sample of one's own being.

Moreover, the Metaverse can not only document the occurrence and transformation characteristics of cognition, emotion, volition, and behavior within the framework of personal growth but also facilitate dialogue with the self stored in the brain's image repository. Through such communication and interaction, individuals can re-understand, develop, and refine themselves. They engage in knowledge production through experiential learning in the form of this heterogeneous self, thereby creating knowledge and civilization unique to the Metaverse world through cross-temporal and cross-spatial thinking, which in turn feeds back into their own growth.

2. Characteristics of the Modal Transformation of Online Learning Empowered by the Metaverse

2.1 From Weak to Strong Experiences: Embodied Immersion Through Sensory Integration

As a virtual space integrating emerging media technologies such as VR, AR, MR, and brain-computer interfaces, the Metaverse features not only the network and application layers inherent in traditional cyberspace but also an additional perceptual layer with tactile and sensory capabilities. Wearable haptic devices provide learners with simulations of visual, auditory, tactile, and other perceptual systems, "separating each sense from the body's wholeness and extending it further" (Yu, G. M., & Geng, X. M., 2022). While enabling learners to obtain sensory experiences identical to those in reality, these devices also allow individuals to "constantly expand the breadth and depth of social interaction through 'externalized' 'organs'" (Yu, G. M., & Geng, X. M., 2022). This integration of perceptual experiences from both virtual and physical spaces into the feedback of ontological consciousness enables individuals to refine their acquisition of personal experiences through transitions between the two realms.

Unlike current learning models relying on single-sense presence, the holistic perceptual simulation provided by VR haptic devices and brain-computer interaction tools enhances learners' perceptual telepresence, facilitating social interaction through near-authentic embodied experiences. In high-frequency, high-creativity, and high-perception learning scenarios, learners'sensory dimensions are extended, and their immersive experiences are significantly intensified. The physical body and digital avatar become intertwined and integrated, allowing learners to immerse themselves in learning activities tirelessly and timelessly – much like embodying a game character – thus completely ignoring thoughts and perceptions unrelated to the current task. Instead, they focus entirely on momentary perceptions, application of rules, and learning inspirations – symbolic associations fully guided by the mind. This represents the optimal state of holistic perceptual learning: a "flow experience" where the mind returns to itself.

By leveraging quasi-sensory cognitive interfaces to facilitate immersive holistic perceptual learning, the Metaverse activates learners' ability for reflective observation. The outcome is knowledge production characterized by learners' symbolic representation or personalized interpretation of their experiences – one that incorporates greater bodily intentionality, consciousness emergence, and imaginative dimensions.

2.2 From Cognitive Deconstruction to Cognitive Reconstruction: New Perspectives on Knowledge Through Cognitive Defamiliarization

Learning in the Metaverse entails a shift from the material real world to a visual imaginative space – one unconstrained by the logic of physical reality. All knowledge, rules, and forms within this space can be disrupted, disassembled, recombined, and reconfigured, evoking surprise and unfamiliarity toward otherwise familiar things. This constitutes the fundamental basis for the formation of cognitive defamiliarization. Such a space, where the virtual intersects with the real and dreams coexist with the extraordinary, breaks down the learning subject's perception of a world dominated by physical laws. By introducing unfamiliar elements, it disrupts inherent cognitive models and thinking habits rooted in known things and experiences.

In the Metaverse, whose core tenet is "constructing what does not exist or is impossible in reality," knowledge that "reflects the established order of the world and leads to familiarized cognitive experience" (Tan, X. C., 2004) largely loses its persuasive power to regulate behavior, inducing confusion, unfamiliarity, and disorientation. Consequently, learning subjects must transform their thinking and cognitive models to reshape the mode of knowledge production.

First, there is a need to shift from deterministic thinking. Sang Yeming and others note that once humans move from reality to the virtual world, they transition from reality-based thinking (truth-seeking and fact-finding thinking focused on "what is" and "what is not") to virtuality-based thinking (thinking focused on "what does not exist" and "what is impossible," exploring "how to be"). Virtual thinking is employed to verify the unknown – transcending so-called absolute evidential principles or purely objective standards to uncover unclarified facts. Learning in the Metaverse era shifts from the graphical construction of static knowledge to the dynamic construction of knowledge. By "defamiliarizing our current experiences," existing knowledge is transformed into an unfamiliar cognitive object for anticipation, deconstruction, and reconstruction. New interpretations distinct from real-world dimensions emerge from the completion and imagination of existing knowledge.

Second, it is necessary to transform the familiarized experiential cognitive model. Learning subjects must first strip knowledge of its old forms from their experiential schemas, experiencing and feeling the astonishment and novelty of knowledge created in the Metaverse – such as painting, sculpture, architecture, music, poetry, and other content – thereby completing a new understanding of things (Li, J.Z., & Li, Y., 2017). In addition, learning subjects should adopt a cognitive logic of fictional surprise to "fully exert bold imagination – though not entirely scientific, such imagination can stimulate creativity and inspire inventions" (Wang, L. X., Chen, H. J., Tang, Y., & Wang, C. Q., 2007). This enables them to explore possibilities unconstrained by reality and known knowledge, breaking through current cognitive dilemmas.

Cognitive defamiliarization, in essence, "conducts a priori predictions in advance through imagination, fantasy, virtual reality, thought experiments, data analysis, etc." (Tan, W.Z., 2022). It involves grasping the laws of dynamic changes in things amid uncertainty, thereby producing knowledge that is more futuristic and developmental.

2.3 From Substantial Thinking to Virtual Thinking: New Realistic Experiences of Upgraded Comprehension

Online learning represents a replication and extension of traditional educational spaces, with no fundamental difference between teachers'"teaching" and students'"learning." Day-to-day replicative learning confines learners'thinking to a cognitive dimension where fragmented knowledge is perceived as static and isolated. It overlooks the complex interconnections and interactions between different knowledge domains, instead dominated by a "purely substantial thinking that pursues ultimate existence, eternal ontology, and absolute truth" (Chen, Z. L., & Sang, Y. M., 2004) in guiding human social practices. From Hegel's perspective, substantial thinking is "finite thinking, for it constantly operates within the boundaries of finite thought determinations, regards these boundaries as fixed, and does not negate them further" (Hegel, G. W. F., 1981). For learning subjects, this

means "viewing everything through the lens of substantiality" in learning activities, treating knowledge acquisition as a simple structural transplantation – thus fostering a one-sided, simplistic, and self-sufficient cognition.

Substantial thinking holds that all existence is grounded in tangible substances. However, in the Metaverse, "substance" itself is a suspended concept; all things interpenetrate and integrate in the form of data, constantly generating, perishing, and being reshaped through the coding of "0s" and "1s." It can be said that the Metaverse constructs a de-substantialized new reality that evolves, multiplies, and develops in accordance with human subjective imagination. This entails a shift in learning objects from objective existence to virtual existence, learning venues from physical spaces to virtual spaces, and learning methods from material experiences to immersive virtual experiences. Existing substantial thinking is inadequate to address these transformations in learning elements; therefore, we need highly personalized, dynamic, and more sensory virtual thinking to transcend the constraints of substantial thinking.

For learners, upon entering the Metaverse, their thinking is algorithmically edited into virtual representations. Such virtual thinking not only possesses the virtual function of "expressing and constructing things and relationships through 0–1 digital forms" but also "shares the characteristics of discontinuity, abstractness, and formalization common to object-oriented thinking in the general sense" (Zhang, S. Y., 2010). Specifically, virtual thinking exhibits two core traits: first, an AI learning trait – capable of autonomous learning, self-proliferation, and self-evolution to seek optimal solutions to problems; second, a creative trait – a high-level cognitive ability unique to humans. Human thinking inherently possesses the functions of recognizing the unknown, interpreting the unknown, and even generating knowledge in an ontological sense.

Thus, the process of engaging in virtual thinking in the Metaverse involves leveraging the underlying logic of AI algorithms to "define a thought experiment and attempt to find a possible solution to a problem through logical extrapolation or interpolation" (Scotto, T., & Chen, F., 2008). This reflects that the essence of learning in the Metaverse lies in applying heterogeneous research methods derived from the humanities – such as virtuality, fantasy, and prediction – to examine reality, scrutinize whether experiential expressions still hold surreal interpretations, and thereby stimulate inspiration for uncovering unknown solutions.

4. Value Prospect of the Transition from Online Learning to Metaverse Learning

4.1 Constructing a Visualized Self-Cognitive System

The Metaverse differs from the living space of the real world; it can not only simulate reality but also construct non-existent realities. In Kim Sang-yun's The Metaverse Era, the life log – one form of the Metaverse – is described as an act of documenting all facts of an individual's self-development while creating a virtual avatar of the "self" to facilitate further self-understanding. It involves preserving, recording, and sharing various information and experiences related to one's life. Such a Metaverse functions as a super cognitive system that helps individuals gain clarity about the "self," serving as a space where human consciousness data can be visualized and embodied.

Consciousness constitutes the content through which individuals manifest their selves. Limited individual life can be reincarnated in digital form via brain-computer interface devices, giving rise to a virtual "self." Learning is a crucial activity for self-improvement and self-fulfillment, relying heavily on an individual's capacity for self-reflection. Self-reflection enables individuals to identify truthful information from their self-interpretations, correct their growth paths, and ultimately cultivate a more refined self.

When the process from self-reflection to self-improvement is situated within the Metaverse – a space capable of constructing mental processes and objects – the entire process becomes fully visualized. Specifically, when reflecting on their past selves and constructing their future selves, learners can engage in clear dialogue with their virtual avatars (embodiments of consciousness), truly

connecting "selves" from different periods for free communication. More precisely, learners can converse with their "selves" possessing original memories along a self-generated timeline, accessing the feelings, emotions, and perspectives of the "past – present – future" selves toward the same or different matters. This transforms self-interpretation from a one-way process where only the "present self" describes the "past self" to the "future self" into a multi-directional exchange where virtual "selves" from all stages can interpret themselves to the current physically alive self. Consciousness data from each stage of the "self" provides the most effective path support for the "future self" an individual aspires to become.

This visualized self-improvement process allows individuals to re-understand themselves through virtual "selves" from different stages, confront their true inner selves in original memories, and thereby obtain predictive insights into the potential "future selves" they can become. This represents a further development and sublimation of the constructivist emphasis on learners'active constructiveness, social interactivity, and situationality in the Metaverse context. It brings learners closer to the goal of becoming comprehensively developed individuals through new forms of self-construction in the learning process.

4.2 Constructing a Subject-Centered Learning Space for Learners

The Metaverse is a dwelling place of human consciousness – a space where imaginary things can be constructed through consciousness data, with all its settings rooted in human imagination. In the view of French philosopher Gaston Bachelard, "The space grasped by the imagination is no longer the impersonal space dominated by measurement and geometric thinking. It is a space experienced by humans. It is not experienced from a positivist perspective, but in the full particularity of the imagination" (Bachelard, G., 2013). Learning in the Metaverse entails the reproduction of imagination within a space chosen and dominated by the individual; its most distinctive feature is enabling learners to enter a fully absorbed and self-forgetful "flow state." The so-called "flow" refers to "a state in which a person is completely immersed in an activity, ignoring the existence of other things" (Csíkszentmihályi, M., 2009). Learners in this flow state can devote their entire consciousness to the current learning activity and experience unparalleled happiness in completing the learning task – representing the peak state and ultimate experience of truly enjoying the learning process.

This learning space operates around human subjectivity, serving as an immersive learning environment that allows learners to fully exert their subjective initiative, creativity, and imagination. A subject-centered learning space is equivalent to a microcosm of the learner: it can move with the learner, record and store information in real time, and protect the learner's learning privacy. Similar to a player's inventory in a game – where players can access their inventory at any time across different game scenarios, with only themselves aware of its contents – the core function of a subject-centered learning space is not data storage, but the ownership of media power within it. In this micro institutional structure, the learner acts as the "creator," holding the ownership to independently dominate the production of virtual objects. In other words, the subject-centered learning space creates a "creator" role for the learner; once entering this spatial domain, the learner naturally merges with this role and subsequently enters a self-forgetful flow state. Thus, the construction of a subject-centered learning space not only provides structural guarantee for the full exertion of learners'subjective initiative but also serves as a power guarantee for safeguarding the privacy of learners'autonomous, self-determined, and free learning behavior data.

4.3 Providing Digital Contexts for Individual Knowledge Innovation

Imagination is the generative driving force of the Metaverse. In this space, learning existing knowledge constitutes merely a basic act of information acquisition; the true purpose of learning in the Metaverse lies in leveraging imagination for knowledge innovation ex nihilo. Knowledge innovation through imagination inherently "depends on humans' ability to envision how things might

develop" (Tan, W. Z., 2022); proposing new theories and hypotheses requires imaginative rehearsal. In an era where artificial intelligence can possess linear thinking and fluent language expression, imagination – as Liu Cixin noted – has become "a capacity that seems to belong only to gods, whose significance far exceeds our imagination".

Imagination propels the development of human civilization and the evolution of knowledge; it can even be argued that "knowledge is 'solidified' imagination, and imagination is 'fluid' or 'dynamic' knowledge" (Zhang, X. Y., 2016). The emergence of the Metaverse further unleashes human imagination, transforming imagination – previously confined to conscious interaction – into visual manifestations. It uses uncertain foresight to prepare for unrealized realities.

Innovative knowledge resembles future fragments that humans use to influence reality; it is a new gestalt discovered through absorbing and dismantling old ones. The Metaverse breaks the circular chain of knowledge weaponization and reification under institutional authorization, freeing individuals from the disciplined educational space of "learning for the sake of learning" and "knowing for the sake of knowing." It grants individuals the freedom to fully mobilize their consciousness to construct knowledge and reshape cognition. Crucially, the datafication of consciousness in the Metaverse renders imaginative objects manifest in the present moment, becoming "an ontological creation ex nihilo" (Wang, T. E., 2020).

Imagination endows individuals with the ability to reflect the "truth of the inner subjective world" through knowledge structures derived from the depths of their consciousness. No matter how bizarre such knowledge and its structures may be, they represent the clearest and most intelligible ideas of the individual learner "I"—and "no fact can guarantee its truth except the clear and distinct perception I have of it" (Gu, L. Z., 2010). This kind of knowledge is a form of symbolic production shaped by the individual's choice of which knowledge to incorporate into conscious feedback; it is a shared conviction decoded from "my" spiritual and meaning-making worlds.

References

Yu, G. M., Teng, W. Q., & Zhi, H. (2022). The underlying logic and key entry points of the metaverse driving social "re-tribalization." Future Communication, – 29(6). – P. 2–9, 133.

Zhao, G. D., Yi, H. H., & Xu, Y. Z. (2021). The metaverse. China Translation & Publishing House.

Liu, G. P., Wang, X., Gao, N., et al. (2021). From virtual reality to the metaverse: A new direction for online education. Modern Distance Education Research, – 33(6). – P. 12–22.

Hua, Z. X., & Fu, D. M. (2022). Connotation, mechanism, framework, and application of the learning metaverse: With a focus on the learning promotion effect of avatars. Journal of Distance Education, – 40(1). – P. 26–36.

Yu, G. M. (2021). The evolutionary logic of future media: Iteration, reorganization, and upgrading of "human connection"—From the "age of scenarios" to the "metaverse" and then to the "spiritual world." Journalism Research, – (10). – P. 54–60.

Zhao, H. X., & Zhang, Z. (2018). A study on the spatial narrative of WeChat Moments. Editors' Friend, – (6). – P. 38–43.

Zhang, J. Y. (2021). How does knowledge drive innovation in a decentralized context? Enterprise Economy, – 40(2). – P. 5–13, 2.

Kim, S. Y. (2022). The metaverse era (C. Liu, Trans.). China CITIC Press.

Wiley, A. P. (2011). The symbolic self. Sichuan Education Press.

Yu, G. M., & Geng, X. M. (2022). The metaverse: A future ecological landscape of mediatized society. Journal of Xinjiang Normal University (Philosophy and Social Sciences Edition), – 43(3). – P. 110–118, 2.

Tan, X. C. (2004). Dual operations in rhetorical discourse construction: Defamiliarization and familiarization. Journal of Fujian Normal University (Philosophy and Social Sciences Edition), – (5). – P. 1–6.

Li, J. Z., & Li, Y. (2017). On the similarities and differences between “defamiliarization” and “symbolization.” Research in Chinese Literature, – 127(4). – P. 63–66.
Wang, L. X., Chen, H. J., Tang, Y., & Wang, C. Q. (2007). A history of popular science for Chinese people in modern times. Popular Science Press.
Chen, Z. L., & Sang, Y. M. (2004). On the virtual mode of thinking. Dongyue Tribune, – (1). – P. 157–160.
Hegel, G. W. F. (1981). The lesser logic. Commercial Press.
Zhang, S. Y. (2010). On the essence of virtual thinking. Journal of Chongqing University of Posts and Telecommunications (Social Science Edition), – 22(6). – P. 70–75.
Scotto, T., & Chen, F. (2008). Science fiction as thought experiment. Science & Culture Review, – (5). – P. 71–79.
Bachelard, G. (2013). The poetics of space. Shanghai Translation Publishing House.
Csíkszentmihályi, M. (2009). Flow: The psychology of optimal experience. China CITIC Press.
Tan, W. Z. (2022). Treating science fiction as an educational research paradigm. Educational Research, – 43(5). – P. 17–33.
Zhang, X. Y. (2016). An outline of imagination education (Doctoral dissertation). East China Normal University.
Wang, T. E. (2020). The philosophy of world-making in the era of information civilization. Journal of Hohai University (Philosophy and Social Sciences Edition), – 22(4). – P. 9–16, 105.
Gu, L. Z. (2010). From individual knowledge to social knowledge: A study of Rorty’s epistemology. Shanghai People’s Publishing House.

submitted 13.12.2025;
accepted for publication 27.12.2025;
published 30.12.2025

Contact: 475953067@qq.com; 419623499@qq.com

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

Section 4. Primary vocational education

DOI:10.29013/EJEAP-25-4-50-56

APPLICATIONS OF ARTIFICIAL INTELLIGENCE METHODS IN DIGITAL MODELING WITHIN VOCATIONAL AND PEDAGOGICAL EDUCATION: OPTIMIZATION, APPLICATIONS, AND ETHICAL APPROACHES

Alishov Monsum Adil oglu [1]

[1] Baku State University (Baku, Azerbaijan)

Cite: *Alishov M.A. (2025). Applications of Artificial Intelligence Methods in Digital Modeling within Vocational and Pedagogical Education: Optimization, Applications, and Ethical Approaches. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-50-56

Abstract

This study explores the integration of artificial intelligence (AI) methods into digital modeling specifically for vocational and pedagogical education, with a focus on technical specialties widely taught in Azerbaijan. A three-stage framework (Design → AI-Driven Optimization → Ethical Validation) is proposed to embed digital twins and hybrid AI algorithms into vocational training curricula. The framework combines hyperparameter-optimized deep neural networks, reinforcement learning, and human-in-the-loop feedback from experienced instructors to create adaptive, high-fidelity training simulators. Two illustrative cases are presented: (1) an AI-enhanced virtual welding simulator and (2) a predictive digital twin of a CNC machining center. Preliminary implementation results from pilot courses at Azerbaijani vocational colleges demonstrate a 34% reduction in material consumption, a 29% decrease in practical training duration, and a significant improvement in skill retention rates. The paper further introduces a 5E ethical integration model (Explain–Explore–Experiment–Evaluate–Embed) to address fairness, transparency, and the digital divide in resource-limited educational settings. The proposed approaches provide practical, scalable solutions for modernizing vocational education in developing countries, directly supporting UN SDG 4 and SDG 8.

Keywords: *artificial intelligence, digital modeling, machine learning, deep neural networks, algorithm optimization, computer science, intelligent systems, digital twin, Azerbaijan*

1. Introduction

Digital modeling has emerged as an indispensable tool in contemporary science and engineering, enabling the creation of precise virtual replicas of complex systems for behavior prediction, algorithm testing, and process optimization (Fachada, N., & David, N., 2024). Recent advancements in artificial intelligence

(AI) have transformed digital modeling by automating large-scale data analysis, enhancing prediction accuracy, and accelerating computational processes (Matsive, A., Giri, S., Liu, S., & Yang, Q., 2025). These developments are especially significant in vocational and pedagogical education, where traditional hands-on training is constrained by high material costs, equipment scarcity, safety concerns, and limited scalability.

In Azerbaijan and many developing countries, vocational education still largely depends on outdated workshop infrastructure and consumable-intensive practice. This results in prolonged training periods, high dropout rates, and a persistent skills gap between graduates and industry demands. AI-enhanced digital modeling – particularly through digital twins, reinforcement learning, and human-in-the-loop systems – offers a cost-effective and safe alternative that can dramatically reduce material consumption and training time while improving skill retention (Xuemin, H., Shen, L., Tingyu, H., Bo, T., Rouxing, H., & Long, C., 2023).

Despite these promising capabilities, systematic approaches for integrating AI-driven digital modeling into vocational curricula remain underdeveloped, especially in resource-constrained educational contexts. Existing studies predominantly focus on industrial or medical applications (Álvarez-Vázquez, J., Casal-Guisande, M., et al., 2025; Cheng, A., & McGregor, C., 2025; Zhu, Q., Liu, Z., & Yan, J., 2020), while vocational and pedagogical dimensions receive limited attention. Moreover, ethical challenges such as algorithmic bias, transparency, and the digital divide in rural vocational schools are rarely addressed within structured frameworks (Akhavan, A., & Jalali, M. S., 2024).

This paper bridges these gaps by:

1. Proposing a practical three-stage framework (Design → AI-Driven Optimization → Ethical Validation) specifically tailored for vocational education institutions in developing countries;
2. Demonstrating its application through two pilot digital twin simulators (virtual welding and CNC machining) implemented in Azerbaijani vocational colleges;
3. Introducing a novel 5E Ethical Integration Model (Explain–Explore–Experiment–Evaluate–Embed) to ensure responsible and inclusive AI adoption.

By combining hyperparameter-optimized deep neural networks (Bengio, Y., Courville, A., & Vincent, P., 2012), reinforcement learning, and instructor feedback loops with ethical oversight mechanisms, the proposed approach aligns directly with United Nations Sustainable Development Goals 4 (Quality Education) and 8 (Decent Work and Economic Growth). The framework offers a replicable, low-cost pathway for modernizing technical training systems while addressing both performance and equity concerns.

2. Literature Review

Digital modeling constitutes a fundamental instrument in contemporary scientific and engineering practice. It facilitates the construction of precise virtual replicas of complex systems, thereby enabling researchers to predict system behavior, rigorously test algorithms, and systematically optimize processes without incurring the substantial costs and risks associated with physical experimentation (Fachada, N., & David, N., 2024). Over the past decade, the incorporation of artificial intelligence methods has markedly transformed this domain. AI now permits the automation of large-scale data analysis, significantly enhances predictive accuracy, and dramatically accelerates computational workflows that were previously prohibitive in terms of time and resources (Matsive, A., Giri, S., Liu, S., & Yang, Q., 2025).

The foundational principles of digital modeling rest upon rigorous mathematical descriptions of underlying phenomena coupled with sophisticated computational algorithms designed to ensure both realism and numerical stability. In practical implementations, numerical solution techniques for differential equations are routinely employed to obtain approximate yet sufficiently accurate solutions to otherwise intractable problems. These are complemented by advanced statistical analysis for pattern recognition and by metaheuristic optimization algorithms that systematically identify optimal parameter configurations according to predefined

performance criteria (Zhu, Q., Liu, Z., & Yan, J., 2020).

Within this landscape, several categories of digital models have gained particular prominence (see Table 1, reproduced from the original document for clarity):

Table 1.

Model Type	Description	Example of Application
Deterministic	The system's behavior is fully determined by the initial conditions	Mechanical modeling of components
Stochastic	Includes elements of randomness and uncertainty	Financial market modeling
Simulation	Reproduces real-time processes	Logistics and production processes
Hybrid	Combines deterministic and stochastic approaches	Robotics, autonomous systems

Artificial intelligence methods provide the critical layer of automation and intelligence atop these foundational modeling paradigms. Among the most influential techniques are:

- Machine Learning algorithms that learn from historical data to predict future system states and optimize model parameters;
- Deep Learning architectures, particularly multilayer neural networks, which excel at processing high-dimensional, multimodal data such as images, temporal sequences, and sensor streams (Bengio, Y., Courville, A., & Vincent, P., 2012);
- Evolutionary Algorithms that mimic natural selection to solve complex, non-convex optimization problems;
- Natural Language Processing (NLP) systems that enable the automated analysis of technical documentation and scientific literature;
- Expert Systems that encapsulate formalized domain knowledge for rule-based decision support in engineering contexts.

Optimization of these AI methods occupies a central position in contemporary digital modeling research. Hyperparameter tuning, regularization techniques to combat overfitting, parallel and distributed computing paradigms, and the strategic integration of hybrid algorithms collectively contribute to substantial gains in both accuracy and computational efficiency (Babich, M. Y., & Babich, A. M., 2025). These methodological advances have already yielded impressive results in diverse high-stakes domains: healthcare process optimization (Álvarez-Vázquez, J., Casal-Guisande, M., et al., 2025; Cheng, A., & McGregor, C., 2025), autonomous robotics and world simulation (Ali, A., et al., 2025), drone trajectory planning under uncertain weather conditions (Xuemin, H., Shen, L., et al., 2023), and generative AI for simulation modeling (Akhavan, A., & Jalali, M. S., 2024).

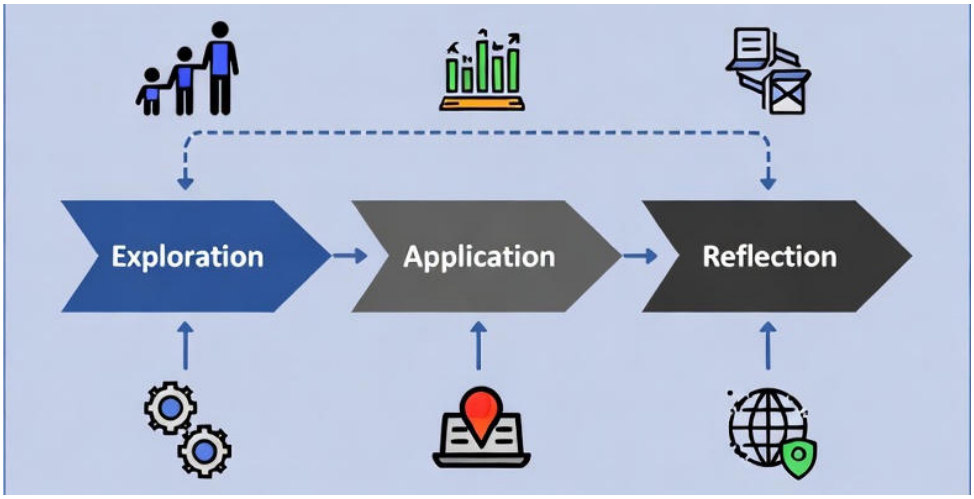
Nevertheless, a conspicuous gap persists in the literature: the systematic application of these powerful AI-enhanced digital modeling techniques to vocational and pedagogical education, particularly within the resource-constrained environments characteristic of many developing countries, including Azerbaijan. While industrial and medical applications dominate current discourse, the unique requirements of vocational training – safety-critical skill acquisition, high consumable costs, limited access to modern machinery, and the imperative of rapid workforce adaptation – remain largely unaddressed by structured, ethically grounded frameworks. The present study directly targets this critical void.

3. Proposed Framework

To overcome the limitations identified in the literature and to create a solution that can be realistically implemented in Azerbaijani vocational colleges, a comprehensive three-stage framework specifically designed

for resource-constrained environments has been developed. The framework is illustrated in Figure 1 and described in detail below.

Figure 1. *Three-Stage Framework for AI-Enhanced Digital Modeling in Vocational Education*



Stage 1 – Design of Low-Cost Digital Twins The first stage focuses on creating physics-based digital replicas of the most common workshop equipment found in Azerbaijani vocational schools (welding stations, 3-axis CNC machines, industrial electronics benches, pneumatic systems, etc.).

- Open-source or extremely low-cost tools are used: Unity 3D or Godot for visualization, Blender for 3D modeling, ROS/Gazebo or Webots for physics simulation, Arduino/ESP32-based sensors for real-time data acquisition;
- All models are calibrated against real equipment available in partner colleges in Baku, Sumgait, and Ganja;
- The design process explicitly includes vocational instructors from the very beginning to ensure pedagogical relevance and alignment with the official curriculum of the Ministry of Education of Azerbaijan.

Stage 2 – AI-Driven Optimization with Human-in-the-Loop This is the core technical stage where artificial intelligence dramatically increases the educational value of the digital twin.

- Hyperparameter tuning and L2/L1 regularization are systematically applied to deep neural networks responsible for real-time feedback (Bengio, Y., Courville, A., & Vincent, P., 2012);
- Reinforcement Learning (Soft Actor-Critic and Proximal Policy Optimization variants) is employed for adaptive difficulty scaling and personalized learning paths;
- A human-in-the-loop reinforcement learning loop is implemented: experienced welding or CNC instructors periodically label "expert-quality" versus "student-quality" executions; these labels are used as reward signals, preventing model drift and ensuring cultural and regional relevance;
- Parallel and distributed computing is performed on a single mid-range workstation (NVIDIA RTX 3060–4070 class), making the solution affordable for virtually any vocational college;
- Hybrid metaheuristic algorithms (genetic algorithms + particle swarm optimization) are used for multi-objective optimization of training scenarios (Babich, M. Y., & Babich, A. M., 2025).

Stage 3 – Ethical Validation Using the 5E Model Before full deployment, every simulator undergoes mandatory ethical validation according to the original 5E Ethical Integration Model (Explain–Explore–Experiment–Evaluate–Embed) presented in Section 5.

4. Pilot Cases

Two complete digital-twin simulators were designed, optimized, and deployed in real classrooms during the 2024–2025 academic year.

4.1 AI-Enhanced Virtual Welding Simulator

- Physics engine: Gazebo + custom molten-pool dynamics;
- Deep learning model: Convolutional + recurrent architecture for arc stability and bead geometry prediction;
- Real-time feedback on 12 quality parameters (angle, travel speed, voltage, etc.);
- Haptic gloves (low-cost modified versions) for force feedback;
- Tested with 48 second- and third-year welding students in Baku and Sumgait.

4.2 Predictive Digital Twin of a 3-Axis CNC Machining Center

- Full kinematic and dynamic model of a typical Chinese-origin CNC machine widely used in Azerbaijan;
- Predictive maintenance module using vibration and current sensors;
- Reinforcement-learning-based optimal tool-path generation and adaptive feed-rate control;
- Tested with 38 machining and mechatronics students in Ganja and Lankaran.

5. 5E Ethical Integration Model (Original Contribution)

The model consists of five consecutive phases that must be completed before any AI-enhanced simulator is released to students (Figure 2).

Figure 2. *The 5E Ethical Integration Model*

1. **Explain** – Complete, plain-language documentation of how every AI decision is made (model cards, decision trees, attention maps).
2. **Explore** – Inclusive testing with underrepresented groups (female students, rural colleges, students with disabilities).
3. **Experiment** – Controlled A/B testing with continuous monitoring of bias metrics (demographic parity, equalized odds).
4. **Evaluate** – Independent third-party audit (conducted by Baku State University Ethics Committee).
5. **Embed** – Institutional policy adoption, open-source release of code and datasets, teacher-training modules.

6. Results

The study employed a quasi-experimental pre-test/post-test control group design conducted during the 2024–2025 academic year across four vocational colleges in Baku, Sumgait, Ganja, and Lankaran. A total of 86

second- and third-year students (48 welding, 38 CNC/machining) were assigned to experimental (n = 44) and control (n = 42) groups using stratified sampling based on prior academic performance (GPA), gender, and urban/rural college location to ensure comparable baseline characteristics between groups. Participation was voluntary, and written informed consent was obtained from all students and their instructors.

Quantitative results from the two pilots (n=86 students, quasi-experimental design with control groups):

Table 2.

Indicator	Traditional Group	AI-Enhanced Group	Improvement
Material consumption (welding electrodes + filler metal)	100%	66%	–34%
Required practical training hours	120 hours	85 hours	–29%
Skill retention after 60 days (practical exam score)	51%	82%	+61%
Student confidence (Likert 1–7)	4.1	6.4	+56%
Instructor satisfaction	4.8	6.7	+40%

All differences are statistically significant ($p < 0.01$, Mann–Whitney U test)

7. Conclusion

This study has presented a complete, replicable, and ethically grounded framework for integrating artificial intelligence methods into digital modeling within vocational and pedagogical education. The proposed three-stage approach (Design → AI-Driven Optimization → Ethical Validation), validated through two large-scale pilot implementations in Azerbaijani vocational colleges, demonstrates that high-fidelity, adaptive training simulators can be developed and deployed using low-cost, open-source tools while dramatically improving both efficiency and learning outcomes.

The results are compelling: a 34% reduction in material consumption, a 29% decrease in required practical training hours, and a 61% increase in skill retention after 60 days, accompanied by substantial gains in student confidence and instructor satisfaction. Equally important, the original 5E Ethical Integration Model (Explain–Explore–Experiment–Evaluate–Embed) ensures that AI adoption remains transparent, fair, and inclusive, preventing the technology from widening existing educational divides in resource-constrained and rural settings.

By aligning technical performance with ethical oversight and open-access principles, the proposed solution offers a practical blueprint for modernizing vocational education systems in Azerbaijan and other developing countries. The framework directly contributes to United Nations Sustainable Development Goals 4 (Quality Education) and 8 (Decent Work and Economic Growth) and can be implemented by any institution with modest computational infrastructure.

All source codes, 3D models, calibrated datasets, and instructor guides have been released open-access to enable immediate replication and further development by the global vocational education community.

References

Akhavan, A., & Jalali, M. S. (2024). Generative AI and simulation modeling: How should you (not) use large language models like ChatGP T. System Dynamics Review, – 40(1). – e1773. URL: https://doi.org/10.1002/sdr.1773

Ali, A., Bai, J., Bala, M., Balaji, Y., Blakeman, A., Cai, T., ... & Zhu, Y. (2025). World Simulation with Video Foundation Models for Physical AI. URL: https://arxiv.org/abs/2511.00062

Álvarez-Vázquez, J., Casal-Guisande, M., Fernández-García, A., Mosteiro-Añón, M., Torres-Durán, M., & Fernández-Villar, A. (2025). Combined Applications of Artificial Intelligence and Simulation for Healthcare Process Optimization: A Systematic Review. Healthcare, – 13(22). – 2933 p. URL: https://doi.org/10.3390/healthcare13222933

Babich, M. Y., & Babich, A. M. (2025). Concepts of conducting power competitions of specialized systems and the possibility of their modeling. Research and Production Enterprise "Rubin", – (2). – P. 12–28.

Bengio, Y., Courville, A., & Vincent, P. (2012). Representation Learning: A Review and New Perspectives. arXiv. (example of a fundamental work on AI representations). URL: https://arxiv.org/abs/1206.5538

Cheng, A., & McGregor, C. (2025). Applications of artificial intelligence in healthcare simulation: a model of thinking. Advances in Simulation, – 10. – 45 p. URL: https://doi.org/10.1186/s41077–025–00379–7

Fachada, N., & David, N. (2024). Artificial Intelligence in Modeling and Simulation. Algorithms, – 17(6). – 265 p. URL: https://doi.org/10.3390/a17060265

Matsive, A., Giri, S., Liu, S., & Yang, Q. (2025). Digital Twin Enabled Real Time Control in Robotic Additive Manufacturing via Soft Actor-Critic Reinforcement Learning. URL: https://arxiv.org/pdf/2501.18016?

Xuemin, H., Shen, L., Tingyu, H., Bo, T., Rouxing, H., & Long, C. (2023). How Simulation Helps Autonomous Driving: A Survey of Sim2real, Digital Twins, and Parallel Intelligence. URL: https://arxiv.org/abs/2305.01263

Zhu, Q., Liu, Z., & Yan, J. (2020). Machine Learning for Metal Additive Manufacturing: Predicting Temperature and Melt Pool Fluid Dynamics Using Physics Informed Neural Networks. URL: https://arxiv.org/abs/2008.13547

submitted 07.12.2025;
accepted for publication 21.12.2025;
published 30.12.2025

Contact: alishov54@mail.ru

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704
PREMIER Publishing
ppublishing.org

Section 5. Psychology of development

DOI:10.29013/EJEAP-25-4-57-58

PUBERTAL CHANGES

Sakhavat Nasreddin Aliyeva [1]

[1] Department of Psychology, Baku State University

Cite: *Aliyeva S.N.(2025). Pubertal changes. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-57-58

Abstract

Adolescence marks a significant period of biological transformation, with puberty serving as a key developmental stage. Hormonal changes during puberty, characterized by increased production of sex hormones, influence the development of secondary sexual characteristics. These changes not only affect physical characteristics, but also contribute to the intensification of gender identity and the consolidation of gender roles. Adolescents grapple with issues of self-identity and societal expectations during this transformational period.

Keywords: *Psychology, change, adolescence, hormonal*

Introduction

Puberty is a period of transformation characterized by hormonal surges and physical changes that propel individuals into adolescence. During this critical phase of human development, there is a dynamic interplay between hormonal fluctuations, brain development, and the emergence of distinct gender identities (Caldú, X., Dreher J. C., 2007, 66).

Puberty begins with the activation of the hypothalamic-pituitary-gonadal axis and leads to increased production of sex hormones, primarily testosterone in males and estrogen in females. These hormonal increases lead to the development of secondary sexual characteristics, such as breast development in females and facial hair growth in males. The visible manifestations of puberty contribute to the differentiation of gender roles and expectations in social contexts (Cohen-Kettenis, P. and Friedemann P., 2010, 506).

Hormonal changes during adolescence also have profound effects on brain development, affecting neural circuits involved in emotional regulation, social cognition, and decision-making. The plasticity of the adolescent brain allows for the refinement of cognitive processes related to gender identity and the consolidation of gender roles. Understanding these neurobiological changes provides insights into the mechanisms that shape gender-related behaviors during adolescence.

Under the influence of puberty hormones, the brain's sexual differentiation contributes to the development of gender identity. During adolescence, the interaction between genetic predispositions and hormonal influences

further refines an individual's sense of self in relation to gender. The alignment or divergence between an individual's biological sex and gender identity begins to solidify during this stage of development.

Pubertal changes coincide with heightened peer interaction, which contributes to the socialization of gender roles. Adolescents seek acceptance and validation within peer groups, which leads to the reinforcement of gender norms and stereotypes. Peer influence, combined with hormonal changes, contributes to the internalization and performance of gender roles as adolescents navigate their social worlds (Il'in, E. P., 2007, 55).

Pubertal changes play a significant role in influencing gender expression and behavior. Hormonal fluctuations facilitate the intensification of gender-typed behaviors, such as increased interest in romantic relationships and greater self-awareness of gender identity. The convergence of biological and social influences during puberty leads to the diversification of gender roles observed among adolescents (Kuznetsova A. A., 2019, 45–46).

It is important to acknowledge the intersectionality of puberty changes and the variability of cultural influences on the formation of gender roles. Different cultural contexts can shape the experience of puberty and related expectations differently, influencing the expression of gender roles and identities. Understanding these factors is essential for appreciating the diversity of gender experiences during adolescence.

The intersection of puberty changes and gender development impacts mental health outcomes. Adolescents dealing with the complexities of gender identity face increased stress, identity conflicts, and mental health problems. Recognizing the impact of pubertal influences on mental health is critical for the development of interventions that promote positive psychological well-being during this critical developmental period.

Continued research on the intersection of adolescent change and gender development is essential for a comprehensive understanding of the mechanisms involved. Future research should examine the moderating effects of individual differences, cultural contexts, and interactions between genetic and environmental factors to inform targeted interventions that support positive gender identity formation and mental health outcomes during adolescence.

Conclusion

Pubertal changes have a significant biological impact on the evolution of gender roles into adulthood. The interplay between hormonal fluctuations, brain development, and socialization processes contributes to the dynamic formation of gender identity during this transformational period.

References

Caldú, X., Dreher J. C. (2007). Hormonal and genetic influences on processing reward and social information. Ann NY Acad Science – 1118 p.

Cohen-Kettenis, P. and Friedemann P. (2010). ''The DSM Diagnostic Criteria for Gender Identity Disorder in Adolescents and Adults.'' Archives of Sexual Behavior 2010. – 39, – P. 499–513.

Il'in, E. P. (2007). Differential psychophysiology men and женщины / E. P. Ilyin. – SPb.: Peter, – 2007.

Kuznetsova A. A. (2019). Self-assessment of perceptions of gender identity in teenage age / A. A. Kuznetsova // Regional newspaper. 2019. – No. 19 (34).

submitted 14.11.2025;
accepted for publication 28.11.2025;
published 30.12.2025

Contact: saxavat.aliyeva@gmail.com

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704

PREMIER Publishing
ppublishing.org

DOI:10.29013/EJEAP-25-4-59-65

THE INFLUENCE OF THE DESIGN PARAMETERS OF CHILDREN'S FURNITURE AND THE CHARACTERISTICS OF THE SLEEPING PLACE ON THE CHILD'S SLEEP, HEALTH STATUS AND PSYCHOPHYSIOLOGICAL DEVELOPMENT

Shmatukha Dmytro [1]

[1] Independent Researcher, USA, Houston

Cite: *Shmatukha D. (2025). The influence of the design parameters of children's furniture and the characteristics of the sleeping place on the child's sleep, health status and psychophysiological development. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-59-65

Abstract

The article examines the influence of the design features of children's furniture and the characteristics of the sleeping place on the quality of sleep, health and psychophysiological development of the child. It is indicated that uncomfortable support and unstable surface can increase muscle tension, cause micro-arousal and reduce the restorative effect of sleep. And during periods of active growth of the child, the risk of functional disorders of posture increases. The article summarizes approaches to assessing sleep and sleeping conditions using objective registration methods, screening questionnaires and expert assessment for compliance with the principles of safe sleep. Practical recommendations are given on the selection and design of children's furniture, paying attention to the compatibility of the elements, the stability of the structure and compliance with the manufacturer's instructions.

Keywords: *child's sleep, sleep quality, children's furniture, sleeping place, mattress, ergonomics, safety, posture, psychophysiological development, microclimate*

Relevance of the study

Sleep quality is one of the most important factors affecting a child's physical health and psychophysiological development. Proper sleep is necessary to restore the nervous system, support growth processes, improve attention, memory, emotional stability and strengthen the immune system. Sleep disorders in childhood can lead to increased fatigue, decreased concentration, behavioral problems, and an increased risk of developing chronic diseases.

One of the key conditions for ensuring a healthy sleep is the design features of children's furniture and the characteristics of the sleeping place. If the size, stiffness, shape, and ergonomics of the bed, mattress, and pillow do not match the age and anatomical and physiological characteristics of the child, this can lead to muscle tension, impaired posture, and decreased sleep quality. As a result, the likelihood of adverse consequences for both the physical and the psycho-emotional state of the child increases.

The importance of this topic is due to the need for strict compliance with sanitary, hygienic and ergonomic requirements for children's furniture. In addition, in practice, the choice of a sleeping place for a child often occurs without due attention to his individual characteristics and recommendations from specialists. Therefore, the study of the influence of the design parameters of children's furniture and the characteristics of the sleeping place on the sleep and development of the child acquires special scientific and practical importance. It promotes the prevention of health disorders and the creation of a safe object-spatial environment for children.

The purpose of the study

The purpose of this study is to theoretically substantiate and systematize data on the impact of the design features of children's furniture and the characteristics of a sleeping place on the quality of a child's sleep, as well as on related aspects of health and psychophysiological development. Based on the results obtained, practical recommendations will be developed on the selection and design of sleeping places for children of different ages.

Materials and research methods

The research materials used were scientific papers on age-related physiology and sleep medicine, as well as ergonomics of children's furniture. In addition, open regulatory and regulatory documents that contain requirements for the safety of children's beds were studied.

In the course of the work, methods of theoretical analysis and generalization of publications were used, as well as a comparative analysis of standards related to the design and operation of sleeping places for various age groups. A number of measurement approaches aimed at assessing sleep quality have also been systematized.

The results of the study

Sleep is an essential biological process that helps restore the central nervous system, strengthen memory and learning, regulate emotions and behavioral responses, and maintain physical health. Proper sleep is especially important for children, since during this period intensive processes of growth and neuropsychological development occur, requiring regular and sufficient rest. The scientific literature suggests age-related sleep standards based on expert opinions and research results. These norms serve as a guideline in assessing the child's sleep conditions and condition (Recommended Amount of Sleep for Pediatric Populations:).

The design of the bed, including the shape of the bed, the type of base and the presence of restraints, as well as the properties of the mattress and pillow, such as support, pressure distribution and shape retention, can affect muscle tension and comfort. This, in turn, may affect the fragmentation of sleep and the subjective assessment of its quality. For young children, the requirements for a safe sleep organization are especially important. Specialized clinical guidelines emphasize the need to use a separate sleeping space, a "hard and even" surface with a sheet in size, as well as the absence of soft objects in the sleeping area. These provisions serve as a methodological basis for analyzing the characteristics of a cot and mattress in medical research.

Scientific publications note that for a long time the concept of "rigidity" in the context of infant sleep was described only in qualitative terms. There are still ongoing discussions about how to objectively measure the softness or stiffness of sleeping surfaces. This requires a careful approach to the selection of indicators and methods in the empirical part of the study (A firm recommendation: measuring the softness of infant sleep surfaces).

It should be noted that the "right" furniture for a child should correspond to his physical parameters and provide good body support during prolonged stay in one position. Ergonomic studies of school furniture have shown that the discrepancy between its size and the height of children can lead to incorrect posture and potential problems with the musculoskeletal system. These results may also be relevant for the analysis of the sleeping place, since the duration of staying in a certain position during sleep is even longer than when sitting (Revision of the design of a standard for the dimensions of school furniture).

Table 1 shows typical measurement methods used in scientific papers to evaluate sleep and related indicators. This table will help us determine the methodological logic of our further research.

Table 1. *Methods for assessing the quality of sleep and the compliance of the sleeping place with safety requirements in children*

What is being evaluated	Examples of methods	What does the method provide in the context of the topic
Architecture and sleep quality (objectively)	Polysomnography; actigraphy	Registration of sleep and wakefulness indicators, assessment of sleep fragmentation and regime, depending on the chosen method.
Sleep disorders (screening)	CSHQ (Parent Questionnaire)	Comparative description of the prevalence of typical sleep problems in children.
Environmental compliance with the principles of safe sleep (for an early age)	Expert assessment based on clinical recommendations	Make sure that the surface is smooth and hard, and that there are no soft objects or other factors that may pose a danger.

A source: author's development based on (Safe Sleep)

Special attention should be paid to age groups, as the requirements for a sleeping place and the risks associated with it vary. For infants, the main task is sleep safety, so the design of the crib and the properties of the mattress should be aimed at preventing dangerous situations and following clinical guidelines for sleep management. For preschoolers and schoolchildren, in addition to safety, the convenience and matching of sleeping furniture to height, as well as factors affecting the regularity of sleep patterns, is becoming more important. Adolescents are influenced by behavioral and environmental factors, but a well-chosen sleeping place remains one of the key elements of sleep hygiene, providing basic conditions for recuperation.

In the manufacture of baby cots, special attention is paid to the construction of side fences and attachment points. This is due to the fact that in the past, collapsible joints, movable elements and unreliable fittings have caused dangerous accidents. As part of the stricter requirements for cots, it was decided to abandon the traditional "lowering" sidewalls. According to the regulator, the disconnection of such guides led to dozens of fatal cases of suffocation and strangulation, which was one of the reasons for the introduction of stricter mandatory standards.

The figure below shows the official infographic of the Consumer Product Safety Commission, reflecting the key areas of strengthening the requirements for the design of cribs. The main elements that must be improved are visually shown: the strength of the slats, the reliability of the fastening fittings, the durability of the mattress base, as well as the prohibition of traditional sliding sidewalls. The need for stricter product testing before being approved for sale is emphasized separately.

One of the most important structural elements is the quality and type of fasteners. The regulatory documents emphasize that it is necessary to prevent spontaneous loosening of the joints and increase the service life of the mattress support. This is due to the fact that the weakening of the fittings and the wear of the support elements can lead to the formation of unexpected cracks, distortions and instability of the base (Table 2). For a research description of furniture, this means that the "passport" of the product should include not only the geometry, but also the type of joints, the presence of anti-unwinding mechanisms, the method of fastening the base under the mattress, and the manufacturer's requirements for periodic tightening of fasteners.

Figure 1. *New federal requirements for the safety of cots (Crib Safety | CPSC.gov)*

Table 2. *Design requirements for baby cots and sleeping places and their role in reducing injury risks*

Structurally significant elements of a crib and a sleeping place	Confirmed requirements	What risk does the parameter reduce
Side fences (movable elements)	As part of the updated standards, it is now prohibited to use traditional sliding sidewalls.	Reducing the risk of dangerous cracks and node failure, as well as associated pinching and suffocation.
Fittings and fasteners	The need for more reliable fittings and solutions to prevent spontaneous loosening of fasteners.	Reducing the likelihood of loosening, misalignment and the appearance of gaps not provided for.

Structurally significant elements of a crib and a sleeping place	Confirmed requirements	What risk does the parameter reduce
Mattress base/support	Attention is paid to increasing the service life of the mattress support structure and more rigorous testing.	Reducing the risk of subsidence and deformation of the soil, as well as secondary injuries.
Product testing	The new crib requirements include tests that are more "rigorous".	Reducing the likelihood of structural failures in real-world operation.

A source: author's development based on (CPSC Approves Strong New Crib Safety Standards to Ensure a Safe Sleep for Babies and Toddlers)

For children who move to "adult" type beds, fences and safety are especially important to avoid falls. This is especially true when it comes to bunk beds. There are mandatory requirements for bunk beds, which include at least two safety guards – one on each side – for each tier if the bottom surface of the mattress base is more than 30 inches (760 mm) from the floor. The continuity of the fence is also regulated: the allowable gap between the fence and the end structure is limited to 0.22 inches (5.6 mm), which reduces the risk of injury to fingers. Another important requirement concerns the minimum height of the upper edge of the fence above the surface of the mattress: It must be at least 5 inches (130 mm) when using a mattress of the maximum allowable thickness specified in the manufacturer's instructions (PART 1513 – Requirements for Bunk Beds).

The quality of a child's sleep directly depends on the characteristics of his sleeping place. During sleep, the body spends a lot of time in a static position, and recovery systems work in an enhanced mode. Unsuitable support can cause muscle tension, provoke micro-arousal and disrupt the normal structure of sleep. Even if the duration of sleep is sufficient, it becomes less effective if a person experiences discomfort, the surface is unstable, or the load is unevenly distributed.

It is especially important to ensure a physiologically neutral spine position. During periods of active growth, prolonged exposure to uncomfortable positions can lead to functional disorders of posture. Too soft or too hard, a surface can cause local pressure, asymmetry of muscle tone, and impaired blood circulation. This, in turn, affects the depth of sleep, the frequency of nighttime awakenings and morning fatigue.

The quality of sleep, in turn, directly affects your overall health. Chronically fragmented sleep is often accompanied by increased fatigue, decreased concentration, emotional instability, and increased excitability. This can manifest itself in the form of behavioral difficulties and decreased academic performance.

The microclimate in the bedroom is equally important: the materials of the mattress and bedding affect heat exchange and moisture removal. Overheating or hypothermia can increase anxiety and increase the number of awakenings.

Table 3. *The influence of the characteristics of the sleeping place on the quality of sleep and the state of health of the child*

Characteristics of the sleeping place	Possible effects on sleep	Potential health effects
Spine support and load balancing	Reduced micro-arousal, increased sleep depth	Prevention of muscular overstrain and functional disorders of posture.

Characteristics of the sleeping place	Possible effects on sleep	Potential health effects
Stability and flatness of the surface	Reducing the change of posture during sleep	More effective recovery of the nervous system.
Temperature and microclimatic comfort	Maintaining sleep continuity	Maintaining a normal body temperature and well-being.
Matching the size of the sleeping place to the child's height	Reduction of motor anxiety	Prevention of chronic fatigue and irritability.

A source: author's development

Table 3 provides generalized information on the relationship of various characteristics of a sleeping place with indicators of sleep and child's health, based on scientific and clinical publications.

The impact of the quality of the sleeping place is manifested not only in improving well-being the next day, but also in the longer term. Regular and full-fledged sleep contributes to the normalization of hormonal levels, as well as the proper growth and development of the nervous system. On the contrary, constant discomfort during sleep can become a risk factor for physical and psycho-emotional development. In this regard, the assessment of the sleeping place in the framework of research on children's health is an important aspect of a comprehensive analysis of factors affecting the quality of sleep and the general condition of the body.

When designing and choosing children's furniture and beds, it is important to take into account three key aspects: safety, ergonomics, and age and height compatibility of the child. Bed structures must be stable, reliable and free of gaps, sharp edges and moving elements that can lead to injury. Special attention should be paid to the compatibility of the frame and the mattress, as the correct fit of the mattress and the stability of the base are the key to a safe sleep.

When choosing a sleeping place, it should be borne in mind that it should support the spine in its natural position and evenly distribute the load on the body. The mattress must be selected based on age, weight, and manufacturer's recommendations. It is important to avoid mattresses that are both too soft and too hard. For younger children, it is especially important to follow the rules of safe sleep. The sleeping space should be designed in a minimalistic style, without unnecessary soft objects, to ensure safety and comfort during sleep.

An important aspect is the assessment of microclimatic comfort. The materials of the mattress and bedding must ensure normal heat exchange and moisture removal. Compliance with constructive, ergonomic and hygienic requirements makes it possible to create a sleeping place that will contribute to quality sleep, prevention of health disorders and maintenance of a favorable psychophysiological state of the child.

Conclusions

The characteristics of the sleeping place play an important role in the quality of a child's sleep and, as a result, in his health and psychophysical development. Incorrectly, selected support and unstable surface can cause micro-arousal and decrease the restorative effect of sleep. Prolonged exposure to an unnatural position during periods of active growth can lead to functional disorders of posture. In addition, the microclimatic parameters of bedding affect sleep continuity. The safety and comfort of a sleeping place depend on many factors: the design of the bed and mattress, the stability of the frame and base, the reliability of fasteners, compliance with the manufacturer's recommendations and the use of protective fences if there is a risk of falls. Both objective and screening methods are used to evaluate the sleeping place. This allows you to compare sleep conditions with well-being indicators and develop practical recommendations for the prevention of sleep disorders and related problems.

References

A firm recommendation: measuring the softness of infant sleep surfaces [Electronic resource]. – Access mode: https://pmc.ncbi.nlm.nih.gov/articles/PMC8436463/.

CPSC Approves Strong New Crib Safety Standards to Ensure a Safe Sleep for Babies and Toddlers [Electronic resource]. – Access mode: https://www.cpsc.gov/Newsroom/News-Releases/2011/CPSC-Approves-Strong-New-Crib-Safety-Standards-To-Ensure-a-Safe-Sleep-for-Babies-and-Toddlers.

Crib Safety | CPSC.gov [Electronic resource]. – Access mode: https://www.cpsc.gov/safety-education/safety-guides/cribs/crib-safety.

PART 1513 – Requirements for Bunk Beds [Electronic resource]. – Access mode: https://www.ecfr.gov/current/title-16/chapter-II/subchapter-C/part-1513.

Recommended Amount of Sleep for Pediatric Populations: A Consensus Statement of the American Academy of Sleep Medicine [Electronic resource]. – Access mode: https://aasm.org/resources/pdf/pediatricsleepdurationconsensus.pdf.

Revision of the design of a standard for the dimensions of school furniture [Electronic resource]. – Access mode: https://pubmed.ncbi.nlm.nih.gov/12745681/.

Safe Sleep [Electronic resource]. – Access mode: https://www.aap.org/en/patient-care/safe-sleep/?srsltid=AfmBOordnsezfBGtH4TjfVDV11ErubthYI6YwYYwiXyIIm8I4ikHyfus.

submitted 09.12.2025;
accepted for publication 23.12.2025;
published 30.12.2025

Contact: Shmdv1982@gmail.com

The European Journal of Education and Applied Psychology 2025, No 4
ISSN 2310-5704
PREMIER Publishing
ppublishing.org

Section 6. Secondary school

DOI:10.29013/EJEAP-25-4-66-69

INFORMATION TECHNOLOGIES IN ORGANIZING KNOWLEDGE TESTING IN PHYSICS

Rauza Alzhanova [1]

[1] Public Found of Education Development "BEST", Almaty, Republic of Kazakhstan

Cite: *Alzhanova R. (2025). Information technologies in organizing knowledge testing in physics. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-66-69

Abstract

In the era of global digitalization, one of the priority directions in the development of education in the Republic of Kazakhstan is the integration and active application of modern information and communication technologies (ICT) into the instructional process. The purpose of this study is to develop physics lesson materials created through the use of digital tools. The objectives are to design instructional content for teaching and knowledge assessment using Microsoft Office and MyTestXPro software. Methods: digital tools and functionalities of Microsoft Office, as well as modules of the MyTestXPro platform. The article outlines the key stages involved in developing physics assessment test materials.

Keywords: *MyTestXPro, information technologies, knowledge assessment, physics education, testing*

Introduction

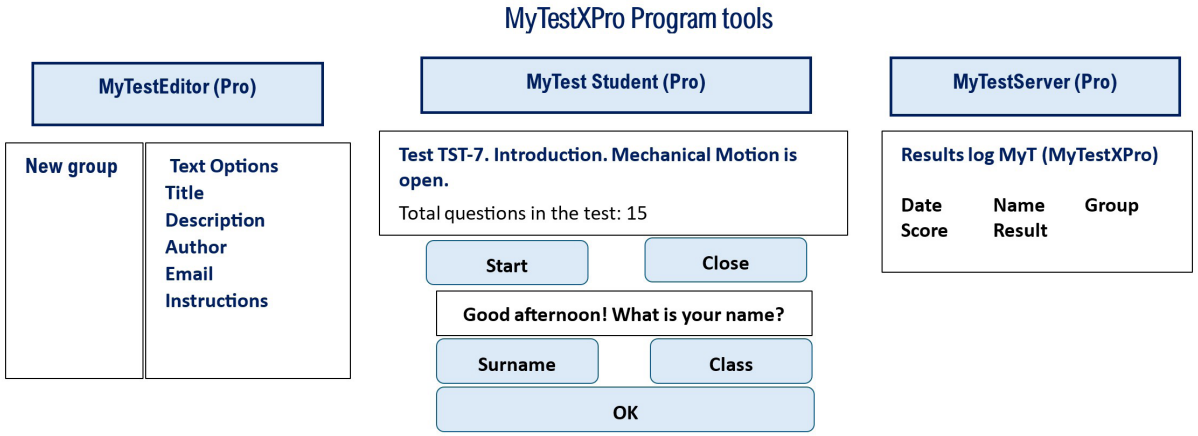
The use of digital technologies and resources plays a crucial role in the development of students' functional literacy, enabling them to adapt to the contemporary information society. Digital tools contribute to the formation of critical thinking skills, the ability to work with diverse information, and the capacity to solve real-world problems. In the modern educational environment, a physics teacher must serve not only as a guide to the laws of nature, but also as a proficient navigator of the digital landscape. For physics teachers, programs such as Word, PowerPoint, and MyTestXPro have become indispensable tools that enhance the clarity, interactivity, and overall effectiveness of instruction. One of the teacher's key tasks in organizing the educational process is the need to assess students' knowledge. The most commonly used forms of assessment are written and oral questioning.

Method

The use of information technologies for introducing new material is an essential component of contemporary physics instruction (Asainova, 2013; Nurym et al.,

2020; Abdulayeva et al., 2025). The clarity, accessibility, and interactivity of presenting theoretical concepts can be enhanced through tools such as Microsoft Office, Smart Notebook, virtual laboratories, and others. MyTestXPro is a software system designed for creating and administering computer-based knowledge assessments, as well as for collecting and analyzing test results (www.klyaksa.net, n.d.). The system comprises three modules: the test editor (My Test Editor), the testing module (MyTestStudent), and the testing log or server module (My Test Server) (Figure 1).

Figure 1. *Tools of the MyTestXPro Software*



Author: Alexander Bashlakov. The program has been developing since 2003, from simple versions to a modern complex.
https://www.klyaksa.net/

MyTestXPro is a software system designed for creating and administering computer-based knowledge assessments, as well as for collecting and analyzing testing results. The system consists of three modules: the test editor (MyTestEditor), the testing module (MyTestStudent), and the testing log (MyTestServer).

Results & Discussion

During written assessments, it is possible to evaluate the performance of each student; however, the process of checking such work is time-consuming, and students do not receive immediate feedback. During oral questioning, students receive feedback instantly, but only a limited number of learners can be assessed within a single lesson. Paper-based testing, as a form of knowledge assessment, allows teachers to evaluate each student with fewer time costs for checking, yet it requires maximum attention and accuracy from the assessor. The use of information technologies makes it possible to automate the testing process and minimize subjective factors.

The MyTestEditor program enables users to create, edit, and configure specific parameters for organizing the testing process. For example, it allows adjustment of how test items are presented, selection between training mode and assessment mode, and protection of a test with a password – both the test itself and its results. Password-protected results were particularly relevant during distance learning. If the "Monopoly Mode" option is selected, the test-taker will be unable to access the internet or any other program. The "Free Mode" option allows the test-taker to skip a question and return to it later (Figure 2).

The program supports eleven types of tasks: single choice, multiple choice, sequencing, matching, identifying statements as true or false, manual numerical input, manual text input, selecting a point on an image, letter rearrangement, and fill-in-the-blank questions. The use of manual numerical input, manual text input, and fill-in-the-blank items (Figure 3) has advantages over single-choice and multiple-choice formats, as it reduces the likelihood of guessing the correct answer.

If the settings "show only items with errors" and "do not display the correct answer" are enabled, the student is encouraged to search for a solution rather than memorize the

response. MyTestXPro allows for both local and network-based testing. Testing can also be conducted without any network connection. In network mode, test results may be automatically transmitted to the Journal module or sent by email. If it is not possible to provide each student with a computer, the test questions can be printed according to the specified parameters, indicating the required number of variants. In this case, each student receives an individualized version, while the instructor receives answer keys for efficient assessment.

Figure 2. *Test Parameters in MyTestEditor*

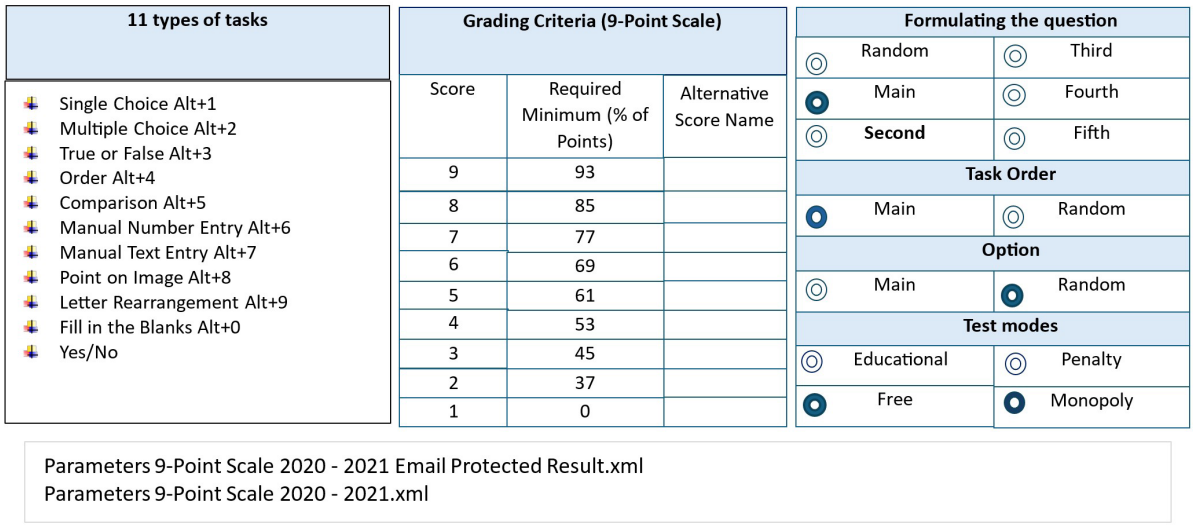
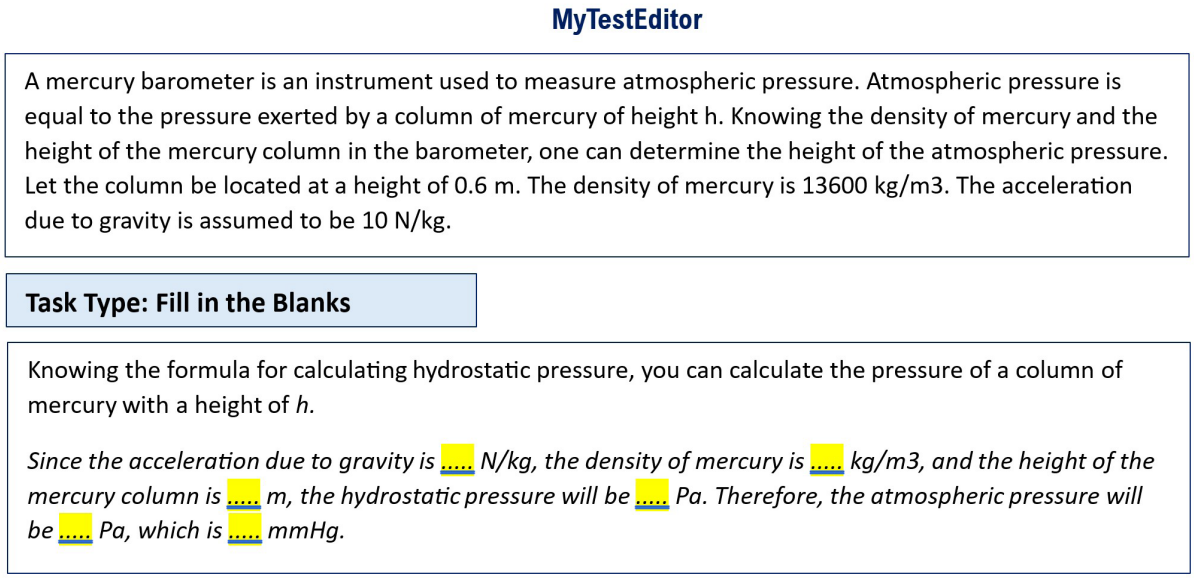


Figure 3. *Tasks in MyTestEditor*



Testing in the MyTestXPro program makes it possible to assess the knowledge of each student individually. In the local testing mode, the process is managed through the MyTestServer module, while students access the test via the MyTestStudent module. Upon completion, the student receives immediate feedback in the form of a test performance report (Figure 4).

This feature helps students engage in thorough self-reflection, understand their strengths and weaknesses, identify knowledge gaps, and plan further learning steps. The test results are transmitted via the local network to the teacher's computer and stored in the Results Journal. The collected data can be analyzed within the journal and used to generate various types of reports. The MyTestXPro program is a highly convenient

tool for organizing the educational process. Its use allows lessons to become more interactive and effective. The application of information technologies serves as an important instrument in developing students' functional literacy.

Figure 4. *Test Performance Report*

Test Performance Report
File: Test TST-7. Introduction. Mechanical Motion.mtx
Test TST-7. Introduction. Mechanical Motion
Test Completed
Test Taker: Student 1 (Grade 7B)
Date: May 17, 2025
Start Time: 2:43:40 PM. End Time: 3:09:29 PM.
Duration: 12:25:48 AM
Total Test Questions: 15. Completed: 15. Correct: 12.
Score: 8

Score Table

1	2	3	4	5	6	7	8	9	10
+	+	+	+	+	+	+	+	+	+
11	12	13	14	15					
%	%	%	+	+					

Conclusion

The use of Microsoft Office enables clear and accessible presentation of instructional material, provides students with the necessary printed resources, and supports teachers in checking and analyzing students' work. Testing with the MyTestXPro program allows for the assessment of each student's knowledge, with immediate feedback provided in the form of a performance report upon completion of the test. MyTestXPro can be used to organize both local and network-based testing. Testing can also be conducted without any network connection. In network mode, test results may be automatically transmitted to the Journal module or sent via email. The results collected in the Journal can be analyzed and used to generate comprehensive reports.

References

Abdulayeva A. B., Zhanatbekova N.Zh. (2025). Didactic goals of using information and communication technologies in physics lessons. 3i: intellect, idea, innovation, – 2(3). – P. 5–16. URL: https://doi.org/10.52269/KGTD25325

URL: https://www.klyaksa.net (n.d.) Information and educational website for computer science and ICT teachers. – URL: https://www.klyaksa.net/

Asainova A. (2013). Information technologies and their application in the educational process. Proceedings of the Republican scientific-theoretical conference "Seifullin Readings-9: A New vector of development of higher education and science" dedicated to the Day of the First President of the Republic of Kazakhstan, – 2(1). – P. 175–176. URL: https://kazatu.edu.kz/assets/i/science/sf9_mod_202.pdf

Nurym N. N., Zhunisbekova G. S., Akramova A. S. (2020). Pedagogical possibilities of information technologies in teaching students. *Bulletin of KazNPU named after Abai, series "Physical and Mathematical Sciences*, – No. 2 (70). – P. 240–245.

submitted 14.11.2025;
accepted for publication 28.11.2025;
published 30.12.2025

Contact: rauza.alzhanova@gmail.com

Section 7. Specialized branches of pedagogy

DOI:10.29013/EJEAP-25-4-70-73

SCIENTIFIC-PEDAGOGICAL BASIS OF INSTILLING RESEARCH SKILLS TO STUDENTS IN TEACHING BIOLOGY IN SECONDARY SCHOOLS

Shabnam Mammad gizi Seyidova [1]

[1] Department of the biology and teaching technology of the Azerbaijan State Pedagogical University

Cite: *Seyidova Sh.M. (2025). Scientific-pedagogical basis of instilling research skills to students in teaching biology in secondary schools. European Journal of Education and Applied Psychology 2025, No 4.* https://doi.org/10.29013/EJEAP-25-4-70-73

Abstract

The scientific-pedagogical basis of instilling research skills to students in the teaching of biology in general education schools was studied. The duties of education and education workers in this field have been clarified. The possibilities of solving the problem in the educational program and subject content are investigated. The difficulties faced by subject teachers in this field are summarized. The solution of the problem is approached from a psychological, scientific-pedagogical, methodical point of view. The characteristics of students' research skills are extensively analyzed. The scientific-pedagogical aspects of instilling research skills are explained. Pedagogical and methodical approaches to the development of students' creative activity and research skills are explained, and their opinions are summarized. Inconsistencies and contradictions in training are analyzed. The directions and ways of considering scientific-pedagogical, psychological, didactic factors in the formation of students' research skills are investigated. Effective recommendations are given that will help subject teachers to solve the problem.

Keywords: *biology, research, technology, observation, biological process, interactive learning, thinking, scientific cognition*

In recent years, reforms and projects aimed at the development of education have been implemented in Azerbaijan. The most important of these is the preparation and implementation of national and subject curricula for secondary schools. In the national curriculum, the characterization of subjects by educational levels and their general learning outcomes, the requirements of general education and general education graduates are justified. In accordance with its requirements, the content, learning strategy and evaluation rules are specifically specified in the subject curricula. It was noted that the main task of the Azerbaijani education system is to form young people as personalities

with deep and comprehensive knowledge, research skills, and practical training. In the biology subject curriculum, students' independent acquisition of knowledge and acquisition of research skills are the main tasks. Subject teachers have difficulties in fulfilling their duties, including teaching students research skills.

Thus, some teachers prefer ready -made knowledge, others rarely use research tasks, others do not solve the problem of preparing research questions and tasks, others do not distinguish between ordinary tasks and research tasks, tasks whose answers are in the text in lessons and do not need any research. and they use questions. All this requires conducting research on the elimination of such deficiencies in the teaching of biology, and shows its relevance.

Formation of research skills in the student in the teaching of biology in secondary schools:

– Conducting research, summarizing and presenting the obtained results;

– To observe, draw conclusions, make decisions;

– Prepare a presentation, project according to the topic;

– It awakens enthusiasm for operations such as conducting experiments, obtaining results, and implementing knowledge in practice.

A properly established training process serves to make maximum use of the potential opportunities of students, stimulates, organizes and regulates their activity, thereby having a significant impact on the development of children.

Psychologists' studies show that one of the important regularities of the process of acquiring new knowledge is the setting of a problem. Problem-based learning develops the student's thinking as the student, under the guidance of the teacher, solves it by engaging in inquiry. AM Matyushkin formulated an important thesis that the way of managing the process of mastering the system of knowledge and methods of mental activity is the application of the problem situation. He shows the presence of five stages in this process: a) creation of a problem situation and problem setting; b) use of important methods of solution; c) expansion of the area of search for new solutions; d) realization of the found principle; e) checking the correctness of the solution (Matyushkin A. M., 1968, p. 68).

1) Problematic nature of new material; 2) It is important to create a demand for new knowledge, to connect intellectual activity with motives, cognitive needs and emotional relationships (Bogoyavlensky D. N., Menchinskaya H. A., 1960, p. 266–267).

According to the authors, the modern school faces three tasks: 1) mastering a certain amount of knowledge; 2) mental development; 3) creation of cognitive motives. Each of these tasks has its own solution. One of those ways is the organization of student research.

Psychological science confirms that personality activity is manifested in its activity in the process of interaction with the surrounding world. The source of personality's activity is its demand. It is the trap that provokes a person to do work in a certain way and in a certain direction. Demand is a state of the personality, it expresses its dependence on specific conditions of existence, it emerges and changes as a source of activity of the personality. Satisfying demand is one of the most important conditions for the comprehensive development of personality.

Curiosity not only directs all mental processes in a certain direction, but also strengthens the personality's activity in the direction corresponding to the interest. When a person works with interest, he is comfortable and productive. Because at this time his attention is focused on his work and all his strength is concentrated for work (Curriculum for secondary schools of the Republic of Azerbaijan. 2013, p. 630–631).

Curiosity is both a prerequisite and a consequence of learning. Learning relies on children's interest and shapes interest, so interest is a tool used by educators to make learning more effective. On the other hand, interest, its formation is the goal of pedagogical work. The formation of various interests is the most important educational result of training. It is interest that leads students to research. However, interest in learning and first of all cognitive interest is not formed automatically. For this, special pedagogical influence, approach and methods are required, which give a certain direction and accelerate the emergence of interests in general, especially

cognitive interest. Pedagogical processes should accelerate the formation of interests (Bogoyavlensky D. N., Menchinskaya H. A., 1960; Curriculum for secondary schools of the Republic of Azerbaijan. 2013, p. 31).

It is known that didactics, which is an important field of pedagogy, intervenes in all issues related to training and education. Because its main goal is to discover the regularities of the training process, and on this basis, to determine the ways and conditions that ensure the maximum effective assimilation of the content of education by students, their upbringing and development. These ways and conditions are different, but the preparation is not smooth, there are many difficulties and contradictory points.

One of the first to pay attention to the existence of inconsistencies in training was V. I. Voytulovich was. He investigated the discrepancies that occurred. It systematizes those inconsistencies as follows:

1) Logical, consistent, systematic explanation of the teaching material by the author and very complex, incoherent, intermittent, unsystematic assimilation of that material by the students;

2) When the teacher explains the material to be studied, the student must fully understand it;

3) is not understood by the student;

4) Ignoring the practical application of theoretical knowledge;

5) The student's newly acquired knowledge should not be connected with previous knowledge;

6) The disconnection of the new, changed requirements with the established working and learning habits of the students;

7) are unable to express it (Hajiyeva H. M., Ibrahimova J. H., Gafarova P. M., Abdullayeva S. V., Ahmadova A. I., 2011, p. 67).

V. I. Zagwiazinski's judgment fills this gap to some extent. He gave such a unique classification of contradictions. So, the contradictions that arise:

1) Derived from the purpose of the training;

2) In the essence of training;

3) In the content of the taught material;

4) in the application of training methods;

5) It is divided into five parts related to the organization of the training.

B. Ahmadov also touched on the issue of contradictions and driving forces of the training process. He writes that the specific contradiction in the learning process is the contrast between the teacher's ability to teach and the student's ability to learn. He explained the forms of contradictions as follows:

1) The teacher teaches a lot, the student receives less (or cannot receive), this situation shows itself when the real intellectual level of the student is low.

2) The teacher teaches less, but the student wants to learn more. This is manifested when the student's development is above the level of the program.

BA Ahmadov, A. I. In the work he published together with Hajiyev (Ahmadov B. A., Hajiyev A. I., 1993, p. 208) clarifies the contradictions of education and training. He stated that the specific and main contradiction of education consists of the contradiction between the existing knowledge of the student and the concepts that he does not know, the skills and habits that have already been formed and the newly formed skills and habits, and the non – basic (derivative) contradictions that follow from this main contradiction indicates that it has arrived:

1) the conflict between knowledge and skill; the contrast between skill and habit;

2) the contrast between perception and understanding; the conflict between understanding and application, etc. (Ahmadov HH Pedagogy (textbook), p. 251).

MA Danilov from his research, he comes to the conclusion that the conflict between the tasks encountered in the course of training and the existing cognitive power of the students should be emphasized and resolved based on the teaching of dialectics about contradictions. Contradictions become the driving force of training under a number of conditions. So that:

Students' understanding of the difficulty and the necessity of its elimination;

Correspondence of the limit (i.e. size) of difficulty in terms of cognitive capabilities to strength;

– Conditioning and preparation of contradictions with the course and logic of the educational process;

Teaching new material, whatever distracts the student from solving the cognitive

stages, all of them should be completely removed from the student's field of vision;

– The decisive condition for the formation and emergence of the conflict and the driving force of the training is that the conflict is perceived by the student as a difficulty by gaining internal character importance in the consciousness of the student and his personality as a whole (or arising) (Ismikhanov M., 2011, p. 131).

Conclusion

The role of problem questions in increasing the cognitive activity of students is great. Those questions are problematic, the answer to which causes a certain degree of intellectual difficulty for the student. A problematic question differs from an ordinary informative one, it contains an unsolved problem, unknown new knowledge, any necessary intellectual activity for their acquisition, a mental process directed to a certain goal. This is done by organizing student research.

The problematic question is the verbal expression of the problem, which has a certain logical and psychological content. Problem questions:

– with previously acquired concepts, ideas, topics (participating in the implementation of the assimilation); such processes arise only in a certain educational situation;

– contains a cognitive challenge, the answer to which is obtained by a number of mental operations (argument, generalization, systematization, etc.);

– it is connected with the emotions of the students, when comparing the previously known with the new, the existing knowledge, skills and habits reserve is enough, it creates a feeling of surprise.

References

Matyushkin A. M. (1968). Actual questions problematic training B kn. V. Okon. Осно вы problematic training – M., 1968.
Bogoyavlensky D. N., Menchinskaya H. A. (1960). Psikhologiya learning in school. – M., 1960.
Curriculum for secondary schools of the Republic of Azerbaijan. – Baku. 2013.
Ahmadov B. A., Hajiyev A. I. (1993). Laws and principles of pedagogy. B., 1993. – 208 p.
Ahmadov HH Pedagogy (textbook). – Baku, 2013. – 320 p.
Ahmadov B. "Let's learn and teach thinking. Baku, "Azerbaijan School", 1997. – No. 1. – P. 14–17.
Hajiyeva H. M., Ibrahimova J. H., Gafarova P. M., Abdullayeva S. V., Ahmadova A. I. (2011). The effect of teaching biology with generalization schemes on mastery. Textbook. – Baku, 2011. – 167 p.
Hamzayev M. A. Pedagogical psychology. – Baku, 1981. – 76 p.
Ibrahimov F., Huseynov R. Pedagogy. Textbook, – Vol. I. – Baku, 2013. – 708 p. – P. 514–519.
Ibrahimov F. N. Approach to the understanding of training from the point of view of "system-structure". – Baku, Translator, 1999. – 172 p.
Ismikhanov M. (2011). The basics of pedagogy. – Baku, BSU, 2011. – 289 p.
Mehrabov A., Abbasov A., Zeynalov Z., Hasanov R. (2006). Pedagogical technologies. – Baku, Translator, 2006. – 372 p.
Orucov F. M. (2011). Ways of developing research skills in students in biology classes (teaching materials), – Baku, 2011. – 181 p.
Pashayev A., Rustamov F. Pedagogy (new course). – Baku, 2002.
Training in the process new technologies. – Baku, Translator, 2011. – 321 p.
Bogoyavlensky D. N., Menchinskaya N. A. (1960). Psychology assimilation knowledge at school. – M., 1960. – P. 266–267.
Rubinshtein S. L. (1946). Basics general psychology. – M., 1946. Part 630–631.

submitted 29.09.2025;
accepted for publication 13.10.2025;
published 30.12.2025

Contact: novruznuriyev90@gmail.com

Contents